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black-breasted laughing thrush (Nestlings)

Photo by : Bhagat Singh



Himalayan Tree Pie (Young) Photo by : Bhagat Singh



Crimson Sunbird *Aethopyga siparaja*

Photo by. Bhagat Singh

The Animal Prayer that Bore Fruit

It, no doubt, sounds fantastic that an animal should ever pray. But there is a story highly suggestive of such a phenomenon. The story is linked with the name of a dynamic historical figure, who in a brief, memorable career rose from being a trailing private to a mighty monarch.

One bright day, as the sun beat down hotly over the scrub forest of the great land of Persia, a young soldier astride a horse drifted into a remote wilderness in pursuit of animals. The trackless jungle was infested with thorny bushes like a grotesque net work-drab, rusty and tortuous.

It was soon past mid day. A sudden breeze had raised the dust all round. In the haze, a pale sun peeped sickly from the zenith. The soldier's throat was parched. His fair face was riddled with innumerable beads of perspiration, like clustered pearls. His chestnut steed was feeling the heat, its sides wet and its nostrils dilating.

In spite of the difficulties, the journey had been uneventful and unrewarding. Not a bird nor a beast! The going appeared to be a veritable wild goose chase so far. Just as the soldier was about to give in the retreat, his disappointment suddenly blossomed into hope. For, under the shade of a distant Acacia tree he beheld an antelope with her fawn. The sight helped to spur the flagging energies of the frustrated hunter, and he urged his horse after the quarry.

The horse galloped with the speed of the wind. But the deer and her fawn were no less swift. At the sight of the approaching horseman they dashed away in the distance, almost like airborne phantoms. The race was an exhibition of grace and skill. Leaving a cloud of dust behind, the galloping horse sped on, soon gaining distance over the fleeing victims.

Then suddenly the little fawn dropped to the ground through exhaustion, while the mother deer vanished behind a dense thicket. The soldier's eyes met the frightened gaze of the fallen baby-deer. Its pink nostrils bulged and the little heap, which was its tawny body, heaved rapidly. What a darling little pet it would make!

The tired sun hung low in the west as the soldier picked up the baby deer and turned away. He must make the journey home before nightfall, so he spurred and goaded on his faithful mount. On the way he coressed his little captive, whose soft warm ribs rose & fell nervously. He would soon try and bring it round. He would rear it well and the fawn would not take long to forget its mother. In course of time it would grow into a shapely, beautiful animal, with a majestic sweep of horns.

At last the dense forest faded into open country and the soldier headed for the city walls. Suddenly, in the soft turf at his rear he heard something approaching him. The soldier had had for some time an intuition that he was being followed. He threw a quick glance backwards and lo and behind to his great astonishment, the mother antelope was cantering gracefully not far behind his own horse, her ears pricked, timid yet determined.

A sudden lust for killing overpowered the soldier. He turned his horse and strung his bow. The deer stopped and wavered, then stood riveted to the ground. Her courageous non-chalance baffled the soldier. He had anticipated to see the animal run for her life. But the animal instinct of self preservation had yielded to maternal selfishness.

The stern hunter could bear the pathetic sight no longer. He lowered his bow and leaning down from the saddle he released the fawn. The baby deer wobbled on its feet and all too soon sank on its knees. There was an anxious pause. Then it rose and shakily trotted and then frisked towards its mother. The mother sniffed at the little one and soon discovered that all was well with it. Then the two darted away from the horseman, into the bosom of the sprawling wilderness far beyond. In a few second the soldier could see nothing beyond a thin trail of dust.

That night, under a full moon which sailed in a cloudless sky, the mother antelope sat in an open thick mounting guard on her sleeping fawn, She still feared for its safety. Then she thanked the Almighty God and her heart poured blessings upon the kindly hunter. May he be a King some dayA King!

That was Subutgin.

Readers View

21st January 2007

To

The Editor

Cheetal

Wild Life Preservation Society of India

7, Astley Hall

Dehra Dun.

Dear Sir,

Thank you for sending me the Cheetal Vol. 44 Nos. 1&2 January 2007, I read with interest the excellent article by Lt. Gen. Baljit Singh and Prerna Singh Bindra (Pioneer July 2006). I regularly read articles on the tiger and threats to it in other journals. What I think is missing in most critiques of the terrible predicament which *Panthera tigris* is facing is the actual destruction of tiger habitat by the Indian government itself and the issue is sought rather to be shown as tribals or forest, dwellers versus Tribals/Forest dwellers. All our large development projects like big dams in (Narmada) mines for open cast extraction of coal such as in the velly of Damodar in Jharkhand, etc. all have the effect of (a) destroying tiger habitats and corridors linking larger forests together, and (b) displacing Tribals and forest peoples. Thus, the destruction of the corridors and habitats by these big industrial projects impacts on the wild life, including tigers and elephants etc., and further, by displacing the people living in these regions places still further pressure on the forests by these landless and homeless people having to relocate themselves, which very often is in forest areas. This further strains the forest ecosystem. I would like our writers and careful observers of the tigers predicament to focus on what these big industrial projects by the government itself are doing to destroy the range of the Tiger in India, and stop targeting the Tribals and forest peoples for destroying Tiger habitats.

Thank you very much for keeping us so well informed. Also thank you for reviewing in the above issue our book *The Forest of the Buddha* (P.41.).

With best wishes,

Yours sincerely

(Balu Imam)

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A Popular Trek in Kumaon Himalyas

PINDARI-KAFNI GLACIER TREK

Dhananjai Mohan*,

When I decided to go on the Pindari glacier trek, I was visibly excited. This was the trek which introduced Himalayas to me 23 years ago when I trekked to this glacier in October 1983 along with student colleagues from IIT Kanpur. I had by then started serious birdwatching and was also making some elementary observations on nature. I remembered the Spotted Forktail, the Verditer Flycatcher, the White capped (water) Redstart to name a few spectacular birds of the Himalayas. I remembered the dense Kharshu Oak forests around Dhakuri, the awesome snow peaks as seen from there and the single stream emerging from the base of the Pindari glacier making the beginning of one of the special river of the Ganges system which starts its short journey from Kumaon but ends up in Garhwal before merging into the waters of Alaknanda. My observations about the forests then, though highly subjective, had not completely faded from my memory despite the long years. Thus the present trip offered an opportunity to make an attempt at looking at the change that this catchment had experienced in over two decades.

THE TREK

Pindari glacier trek is one of the most popular long treks (over 5 days duration) of western Himalayas and perhaps the most popular long trek in Uttarakhand. Even in 1983 when trekking was not so popular in India, besides our group of 25 students, there was a group from IIM Calcutta and another one from a public school from Delhi. Now during the month and a half season's trekking in May-June and another month in September-October 20-40 people go to the trek everyday based on my observation and discussions with guides and locals. The trek has convenient halting places all through which make it easy for people to trek without any camping equipment. While in 1983 one had to carry rations and other basic utensils to survive during the trek, today small *dhabas* exist at all the halting places making trekking even simpler. One could thus do the trek today without any special preparations and this is one of the important reasons for the popularity of the trek. The distances between halting places with approximate altitude in meters is given below:

From	To	Distance
Song (1300)	Loharkhet	2
Loharkhet (1700)	Dhakuri	10
Dhakuri (2700)	Khati	8
Khati (2210)	Dwali	11
Dwali (2600)	Phurkia	5
Phurkia (3200)	Pindari Glacier (3820)	7

*Associate Professor, Wild Life Institute of India, Chandrabani, Dehradun

In addition to the Pindari trek two side treks also fork out of the main trek route. These are the Kafni glacier trek and the Sunderdhunga glacier trek. Kafni glacier (3880m) is 11 km trek from Dwali along the Kafni gad, a left bank tributary of Pindar. Sunderdhunga trek is along Sunderdhunga gad a right bank tributary

of Pindar. This trek forks out at Khati and not only accesses a couple of glaciers and high altitude lakes but also is popular amongst mountaineers which try to scale some of the snow-peaks of the region. The distances on these sectors with approximate altitudes are as follows:

Kafni side trip

From	To	Distance (Km.)
Dwali (2600)	Khatia	5
Khatia (3200)	Kafni Glacier (3880)	6

Sunderdhunga side trip

From	To	Distance (Km.)
Khati	Jatoli	7
Jatoli	Katholia	12
Katholia	Sunderdhunga	7

An approximate map overlaid on satellite imagery is annexed. The altitudes and GPS readings of latitudes and longitudes of different locations using GARMIN GPS 72 are also annexed as **annexure 1**.

FORESTS

Pindari trek passes through two catchments: Saryu and Pindar. While the initial 11 km lie in the Saryu catchment, the later part of the trek passes through the Pindar catchment. The wide variation in altitude and aspect results in a wide variety of forests in the trek. The forests also have a diverse tenure. The forest types are : **Subtropical forests, Temperate mixed Ban Oak dominated broadleaved forests, Temperate Kharshu Oak forests,**

Moist Temperate deciduous forest, Moist Sub-alpine forests & Moist Alpine scrub. LEGAL CONTROL

The Pindari trek passes through the Saryu valley initially before crossing over to the Pindar valley near Dhakuri. The Dhakuri ridge which makes the boundary between the two also makes an important legal distinction between the legal status of the forests. While the forests on the Saryu side are all of Van Panchayat status the forests on the other side are reserved forests of Dhakuri block. This block is divided into 19 compartments. Compartments 8 to 19 are in the control of the forest department of which compartments 12 to 19 comprise the Dhakuri beat. These forests cover the upper slopes of the southern face of the

Pindar valley extending up to the Dhakuri ridge. Another far flung forest patch is the Sunderdhunga block with compartments 1 to 5. These along with Dhakuri compartment 8-11 comprise the Sunderdhunga beat. Presently both the beats are being manned by the same forest guard.

The Dhakuri compartments 1 to 7 have been placed under the control of Khati Van panchayat. These are the gorgeous forests which one can see while trekking from Khati to Dwali and there after to Phurkia. The forests of the Kafni valley although in Pindar catchment are under a van panchayat of Juni village which lies in the Saryu valley. Apparently Saryu valley does not have good forests hence this arrangement.

The details of major van panchayats of the Pindari trek route are given in **Annexure 4.**

The area above Phurkia is said to be of Civil (Protected) forests status and apparently has no regulations. The grazers divide the area amongst themselves to avoid disputes.

The upper Pindar valley (beyond Dhakuri ridge and Khati) fall under the buffer zone of the Nandadevi Biosphere Reserve (NDBR) as per the revised boundaries of the reserve.

WILD ANIMALS

Mammals:

No signs of mammals were seen in much of the trek. It seems that even Barking Deer occurs in very low densities compared to other hill forests in the Pindar valley. The accompanying forest guards didn't have any idea about their presence.

Area close to Pindari glacier is known for Bharal. It is said that herds of this animal can be seen close to the zero point in late autumn. On scanning the slopes around the Pindari glacier, I was rewarded by a sighting of a small herd of 4 Bharals grazing on a high and steep slope on the immediate west of Pindari glacier. The altitude may have been a little above 4000 metres.

There are many steep rocky grass covered cliffs on the way down between Phurkia and Dwali which appeared to be ideal habitats for Himalayan Tahr. Our local helpers claimed to have seen a couple of Tahrs midway between Phurkia and Dwali on the opposite steep slope.

There isn't much talk about Leopards and any damage to domestic animals.

The young religious *baba* (some 35 years of age) who has built a small 'ashram' 1.5 km short of Pindari zero point and whose name to fame is over-wintering at the same site, claims to have seen large herds of Bharals and occasional Snow Leopard. The *baba* surprised us by his knowledge of worldly affairs which came as a sharp contrast to the belief that he goes into a *Samadhi* through the harsh winters at an altitude of 3600m when everybody withdraws from these difficult conditions. He said he owned a Nikon 601, had visiting cards with an email id which he said he uses when he accesses his emails during occasional visit to Bageshwar.

Birds:

Typical birds of western Himalayas could be seen during the trek. Birdwatching was at a relative low key during the trek

because large distances had to be covered during each day (approximately 20 km per day). Last two and a half day were completely washed out by incessant rains with near zero birdwatching.

In all 100 species of birds could be seen during the trek. Many birds particularly in the upper temperate and alpine zone were in breeding mode with many of them displaying/singing. Amongst galliforms few sightings of Monal above altitudes of 3000 metres, calls of Koklass from the valley below Phurkia, Hill Partridges calls beyond Khati are noteworthy. Other interesting birds were eight species of *Phylloscopus*, six species of Tits, Fire-tailed and Green tailed Sunbirds, five species of Cuckoos etc. The entire list is given in **annexure 5**.

The Upper Pindar catchment is also one of the 14 important bird areas (IBA) of Uttarakhand owing to the presence of Vulnerable and restricted range Cheer Pheasant and a host of biome restricted species. (Islam and Rahmani, 2004)

Other taxa:

The only observation besides above that is worth mentioning here is the occurrence of Birdwing butterfly (perhaps Golden Birdwing *Triodes aeacus*) which was seen around Khati village. This beautiful butterfly is also one of the largest in the country.

MANAGEMENT ISSUES:

Pindari trek through the Pindar and Saryu valleys is unique in its management. Much of the forests in this route are community owned and only small stretches are with the forest department. The presence of the forest department is

negligible in the Pindar valley. There are two beats in the Pindar valley (Dhakuri and Sunderdhunga) presently manned by one forest guard. Another forest guard has been posted in the valley to boost up the ecotourism in the region.

The low importance to the upper Pindar valley for the forest department seems to be dating back to the British period. Absence of Forest Rest Houses in the valley can be taken as an indicator of it. The forests here were not of great commercial value as they are poor in conifers or other 'commercially' important species. Access to the valley is also difficult and one can enter it only after an arduous climb which involves a climb from Song (1300 m) to Dhakuri Pass (2880 m).

With the headquarter of the erstwhile East Almora division shifting to Bageshwar in the form of Bageshwar division a few years back, there seems to be an increased attention to the Pindar valley from the forest department side. Another welcome initiative has been the involvement of Nanda Devi Biosphere Reserve (NDBR) in the management/development of the area. NDBR has been involved in certain works in and around Khati village which is also the key village in the management of the valley. In the last financial year certain soil and moisture conservation works, maintenance of trekking paths and planting of fruit yielding trees has been done from the funds provided by the NDBR. These works have rightly been executed by the staff of the DFO Bageshwar because they have the presence and rapport with the local people.

A society has been registered with the efforts of the forest department for developing ecotourism in the valley. The villages represented in the society are the ones which fall in the route of Pindari glacier trek namely Chaura, Harkot, Wachum and Khati. Ironically there is no representation of the forest department in the society's governing body although it played a key role in its creation (Sh. D S Kapkoti, Forest Guard, Ecotourism, pers. comm.). The society has been recently registered but is yet to initiate any concrete steps in the management of tourism in the valley. At a later stage villager from Juni village may also be included in the society as the route to Kafni glacier falls in the van-panchayat controlled by them.

GRAZING

There is considerable amount of grazing in the Pindar-Kafni valleys. The grazing is mainly by sheep and goat and is seasonal in nature. From the information collected during the trek, it appears that the sub-alpine and alpine areas of the Pindar valley are largely grazed by the sheep and goat of the Saryu valley which come from the villages near Kapkot. The animals from Khati village graze in the Kafni valley and those from the Wachum village cluster graze in the Sunderdhunga area. The areas where much of the grazing goes on have a status of civil forests and hence no control exist and regulation of grazing is in the form of informal division of areas. However while approaching the higher areas the sheep and goat do pass through the *van panchayat* forest mainly of Khati for which their owners have to pay 'something' to Khati people.

The grazing in both the Pindar and Kafni valley is moderate to high which is evident from large areas under the *Rumax nipalensis* particularly at places where the grazing animals spend more time. Large parts of the alpine zone of Pindar and Kafni valleys are covered with *Danthonia cashmeriana* grasslands but it was sad to see certain parts of it burnt out perhaps in previous autumn season when the grazers were withdrawing from the area. Some amount of mule grazing also goes on in the area and it is said that they are left unattended to graze through the summer months.

Talking to the grazers gave some insights into the dynamics of sheep and goat grazing. According to them the number of sheep and goats are declining. Earlier 26 'tolas' (groups) used to graze their flocks in the Pindar valley but the number has declined to 11 now. Even the average number of animals in each *tola* has also halved. On the whole there appeared a lower pressure of grazing in the Kafni valley as compared to the Pindar valley. The opposite slope (left bank) of the Kafni valley still supported considerable Birch-Rhododendron forests.

There is heavy grazing in the upper temperate Kharshu forests near the Dhakuri ridge. The grazing here is by the buffaloes of Wachum village. Years of grazing and trampling have led to a clean forest floor and it is sad to see the once beautiful forests of Dhakuri as having no future. Large cattle camps exist right below the PWD bungalow at Dhakuri.

The temperate forests between Khati and Phurkia are extensive and

although there are signs of heavy grazing at places; by and large they are good in condition. Of course they do not have a high value as forests for animal fodder unlike the Kharshu dominated Dhakuri ridge forests. The huge landslide next to Khati village is a testimonial of the degradation due to grazing and other dependence from the villagers of Khati.

POACHING

Although there were 'stories' about poaching in the Pindar valley, we failed to get any substantive information on it. Barring a few, majority of the people did not talk about the existence of poaching these days. Some did say that poachers may be coming from the Johar/Ramganga valley by directly entering the higher reaches of the valleys. One can't be sure of the incidences of poaching now, but historically it seems to have been taking place. This is supported by the fact that people do not talk about Leopards or cattle kills by Leopards. Similarly the forests seem to be having much lower densities of animal like Barking Deer and Sambar. The animals which seem to have escaped these pressures to a great extent are Bharals and Himalayan Tahr which besides being animals of difficult and relatively inaccessible terrains do not have much value for professional poachers.

RINGAL EXPLOITATION

There is a considerable exploitation of Ringal bamboo from this belt and at a few places there are temporary camps for initial processing of Ringal (cleaning etc.). Ringal has also flowered in the area 2-3 years back and a lot of dead clumps can be seen. With no control over its exploitation, the Ringal crop can suffer permanent

damages particularly considering the gregarious flowering a couple of years back. It is not only the people from Khati village who exploit the Ringal from here but far off villages even from the Saryu valley depend on this resource from Pindar valley. So demand is heavy on a restricted resource. Ringals can largely be seen between Khati and Phurkia and also between Dwali and Khatia.

SUGGESTION

Although my visit to the Pindar valley was brief and my knowledge of the present administrative strategies in the Forest Department of Uttaranchal limited, I am still venturing to give certain suggestions for the future course of management.

PATROLLING

The Pindar valley still supports good forests and is likely to support large mammals and other commercially important products like the medicinal plants, it deserves to have a much better level of protection. As has been stated earlier this huge upper catchment of Pindar river has negligible forest department presence.

It is important to state here that a meaningful action has been initiated in this direction by the Bageshwar division by periodic patrols by a team of forest personnel since October 2005. A project proposal for the funding of the regular patrolling has also been submitted to the higher officials. The major component of the project is camping gear (tents, sleeping bags, high altitude personal wear, etc.), communication equipment, expenses on camping and food etc.

While arrangements as proposed in the project are necessary, more infrastructural development is required in the long run. There is an urgent need to built permanent structure for staff housing during such patrols. Presently there are no *chowkis* for the Forest Guards of Dhakuri or Sunderdhunga beats and they have to depend on the villagers for their stay (and have to pay them). It is suggested that a network of chowkis/T O quarters/camping huts be built all along the route to the three glaciers. This will not only help the patrolling and the local staff but also facilitate the visits of the officials also in the area. A list of proposed buildings is given in **annexure 6**.

It is important here to note that all the material for construction has to be transported on mules from Song onwards. As a result the construction must rely primarily on local material. Prefabricated structures (e.g. tubular huts) can also be considered.

There is a need to develop an intelligence network to effectively control poaching if it exists. In fact through such initiative only one can know about the status of poaching in the valley and then work accordingly about controlling it.

The Himalayan region becomes more prone to poaching in the winter months which necessitates patrolling during these difficult times. There is a need for specialized equipment to patrol in snow bound areas. The staff also needs to be trained for this purpose and help of ITBP or NIM Uttarkashi may be sought for it.

A complete knowledge about the geography of the area particularly the

approach passes from the east and possible routes needs to be gathered.

ECOTOURISM

There is also some headway on this front in the form of registration of an ecotourism society. But the absence of Forest department from the society is rather surprising. The trek does pass through some reserved forest (Dhakuri reserve) which is under the control of forest department. So the department should at least be an equal partner along with the other van panchayats through the forests of which the trek passes.

Establishment of a society is a right step but a lot needs to be done beyond it. The society must regulate the entire trekking/mountaineering activity in the valley. It may start levying an entry fee for the trekkers and the mules and the money so obtained may be used to ensure cleanliness on the route. The management strategy followed by the Bhyundar eco-development committee in the vicinity of Valley of Flowers National Park can be used as a model here. Although Bageshwar division must facilitate in developing ecotourism in the Pindar valley, NDBR management should also play a key role in here as it has was instrumental in the community involvement success story of Valley of Flowers. NDBR may also be in a position to provide funds for certain aspects necessary for the development of ecotourism in the valley. Exposure visits to the Pindari ecotourism society members to Valley of Flowers area can be organized of them to see for themselves, the transformation brought out in this area.

Presently the trekking activity in the Pindar valley is restricted to being an adventure activity and has a weak to non-existent component of nature tourism. There are no services towards nature interpretation and conservation education. Some priority activities in this front could be interpretive signages, interpretation and visitor centers and guided services. Signages about floral and faunal richness, conservation messages, and dos and don'ts could be placed at appropriate places. A signage directing towards snow peaks as visible from Dhakuri can be erected as it commands one of the finest views of certain peaks like Trishul, Nandakhat, Nandakot and Panwalidhar. Visitor centre at Song/Loharkhet and interpretation centre at Dhakuri can be built. Traditionally these have been created around protected areas, but looking at the large number of trekkers and mountaineers visiting the Pindar valley, it can become an important center for educating people about Himalayan biodiversity and its conservation. Guided services can be developed using the local youth who are already involved in the trekking business presently as route guides cum porters as nature guides. With some basic training in nature interpretation in the form of identification of flora and fauna and dealing with the visitors, they can help increase visitor satisfaction and also expect better remuneration.

TENURE OF FORESTS OF THE AREA

The forests of the Pindar valley are largely under the Van Panchayats although some forests are under the forest

department too. Most of the alpine areas are civil forests.

Pindari area has been rated as the top ranking area in the timber line zone of Uttaranchal on the basis of criteria like plant species richness, representativeness, naturalness, uniqueness and endemism (Dhar, et al 1999). A high degree of diversity is noticed in the composition of forest communities. The area also supports high plant (species/community) diversity. It is the only area, which has been placed under priority I amongst all the areas included in the proposals for creation of PAs for the state of UP (now Uttaranchal) (Rodgers, Panwar and Mathur, 2000). The area is contiguous to the Nandadevi National Park, although they meet at a very high ridge, which is permanently snow bound. The area is said to have the largest herds of Himalayan Tahr in India, as well as Bharal, Musk Deer, Serow, Goral, Snow Leopards are probably present. The area also has large and viable populations of six pheasants: Himalayan Snow cock, Monal, Satyr Tragopan, Koklass, Cheer and Kaleej pheasants. As stated earlier the area is an Important Bird Area.

All these suggestions were incorporated in the Biodiversity strategy and action plan of the state of Uttaranchal prepared under the World Bank aided Forestry project (1998-2002) and the area was proposed to be declared as a Wildlife Sanctuary. However looking at the general resistance to declaration of additional areas as protected areas in the new state of Uttaranchal which already has a high percentage of area under the PA network, this suggestion has not been pushed.

Yet the recent (2003) amendment to the Wildlife (Protection) Act, 1972, has opened new options in enhancing the protection status of biodiverse areas which may be considered for the Pindar valley.

This is particularly in respect of Khati Van Panchayat which has large area (1783.8 ha.) of good temperate and sub-alpine forests all along the route from Khati to Phurkia. These areas can potentially be declared as a Community Reserve under section 36-C of the Act if the villagers of Khati so decide. The villagers may be explained the concept of such reserve and the prohibitions associated with it. If declared as a community reserve, it is likely to streamline the management of the area. The area can well become the first conservation reserve of the Uttaranchal state.

REGULATION ON GRAZING AND RINGAL HARVESTING

While grazing is seen in all the legal categories of the forests viz. Reserved Forest with Forest department, Van Panchayat forests and Civil Forests, Ringal extraction is restricted to the Van Panchayat of Khati village.

Grazing in the reserved forests of Dhakuri is very detrimental to these forests and recently there have been attempts to control lopping of Kharshu through booking of offences. Such steps need to be pushed further as these forests definitely need some rest from years of grazing and trampling in order to regenerate and support undergrowth.

As stated earlier, there seems to be a decline in the high altitude sheep and goat grazing but it may take too long for it end

by itself. Regulating it is definitely not an easy task particularly considering near zero control on the civil areas where it happens. Some deeper studies on the dynamics of grazing in the upper Pindar valley can perhaps throw some light on ways to deal with the problem.

As discussed earlier Ringal extraction also cannot go on the way it is happening, particularly in view of the recent gregarious flowering. If the Community reserve comes in Khati Van Panchayat, it may be a tool to regulate the extraction. Additionally Forest Research Institute may be requested to suggest ways and means to increase the longevity of the products made from Ringal by physical or chemical means. As Ringal is only being used locally for subsistence and not commercially, increasing the life of the products may drastically reduce the demand.

Upper Pindar valley is a rich temperate and alpine area of West-Central Himalayas. It offers immense opportunities for eco-tourism as it already has a very popular trek passing through it. Vast areas under Van Panchayats make community involvement inevitable in any initiative. Needless to say that the area needs a higher attention from the planners and managers.

Acknowledgements

I am thankful to my friend and companion during the trek Sh Deepankar Aron, IRS. Because of his persistent efforts the trek actually became a reality. I particularly thankful to my forester colleagues for all the help extended to us. I shall name Sh SS Rasaily, CF North, Kumaon circle and Sh AK Upadhyay, DFO, Bageshwar in particular in this respect. Sh.

G S Joshi, District Magistrate, Bageshwar was a true host not only at Bageshwar but also throughout the trek where though he was himself not present but ensured that we were absolutely comfortable. My sincere gratitude to him. Sh Hira Singh Jetha, Forest Guard and Sh Dhan Singh

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Annexure 1

ALTITUDES, LATITUDES AND LONGITUDES OF DIFFERENT LOCATIONS (BASED ON GPS READINGS: GARMIN GPS 72)

Location	Altitude in meters	Longitude	Latitude
Loharkhet	1684	30 02 18.5	79 57 01.8
Jhandidhar	2245	30 02 58.5	79 56 08.6
Ratamati	2543	30 03 47.5	79 55 45.5
Dhakuri top	2889	30 04 19.8	79 55 19.9
Dhakuri	2700	30 04 37.1	79 55 12.7
Khati	2248	30 06 15	79 55 27.3
Bridge on Pindar	2307	30 08 55.5	79 58 19.5
Dwali	2601	30 10 38.8	79 58 19.5
Phurkia	3208	30 12 57.5	79 59 57.6
Baba ashram	3675	30 15 34.5	80 00 23
Pindari-Zero point	3830	30 15 58.1	80 00 23
Khatia	3235	30 10 56.5	80 02 04.7
Kafni-Zero point	3845	30 13 01.6	80 03 23.7
Kafni glacier snout	3885	30 13 11.7	80 03 25.7

Annexure 2

AREA OF VAN PANCHAYATS OF PINDAR AND SARYU VALLEY IN AND AROUND THE PINDARI-KAFNI TREK

Name of van panchayat	Area in hectares
Chaura*	362
Wachum*	68.643
Jhuni*	723.556
Sorag	3673.92
Rikhari	58.271
Vadia kot	60.784
Tarsal patidhar	44.614
Kilpara	783.457
Supi	353.979
Kuwari	8.093
Vaichan	91.502
Karmi	343.35
Teekh	81.34
Khati*	1783.825
Munar	42.895
Harkot*	238.745
Daula	121.214
Kafli Kamera	78.709

* Van Panchayats through which the Pindari-Kafni trek passes.

Annexure 3

BIRDS OF PINDARI-KAFNI GLACIER TREK: 29TH MAY TO 4TH JUNE 2006

DHANANJAI MOHAN

S No	Scientific name	Common name
1	<i>Melanoperdix nigra</i>	Black Partridge
2	<i>Arborophila torqueola</i>	Hill Partridge
3	<i>Pucrasia macrolopha</i>	Koklass Pheasant
4	<i>Lophophorus impejanus</i>	Himalayan Monal
5	<i>Dendrocopos hyperythrus</i>	Rufous-bellied Woodpecker
6	<i>Dendrocopos himalayensis</i>	Himalayan Woodpecker
7	<i>Picus canus</i>	Grey-headed Woodpecker
8	<i>Megalaima virens</i>	Great Barbet
9	<i>Upupa epops</i>	Common Hoopoe
10	<i>Hierococyx sparveroides</i>	Large Hawk Cuckoo
11	<i>Cuculus micropterus</i>	Indian Cuckoo
12	<i>Cuculus canorus</i>	Eurasian Cuckoo
13	<i>Cuculus saturatus</i>	Oriental Cuckoo
14	<i>Cuculus poliocephalus</i>	Lesser Cuckoo
15	<i>Psittacula himalayana</i>	Slaty-headed Parakeet
16	<i>Collocalia brevirostris</i>	Himalayan Swiftlet
17	<i>Apus pacificus</i>	Fork-tailed Swift
18	<i>Otus spilocephalus</i>	Mountain Scops Owl
19	<i>Glaucidium brodiei</i>	Collared Owlet
20	<i>Columba livia</i>	Rock Pigeon
21	<i>Columba leuconota</i>	Snow Pigeon
22	<i>Streptopelia orientalis</i>	Oriental Turtle Dove
23	<i>Streptopelia chinensis</i>	Spotted Dove
24	<i>Streptopelia decaocto</i>	Eurasian Collared Dove
25	<i>Treron sphenura</i>	Wedge-tailed Green Pigeon
26	<i>Gypaetus barbatus</i>	Lammergeier
27	<i>Gyps himalayensis</i>	Himalayan Griffon
28	<i>Ictinaetus malayensis</i>	Black Eagle
29	<i>Spizaetus nipalensis</i>	Mountain Hawk Eagle
30	<i>Falco tinnunculus</i>	Common Kestrel
31	<i>Lanius schach</i>	Long-tailed Shrike
32	<i>Garrulus glandarius</i>	Eurasian Jay
33	<i>Garrulus lanceolatus</i>	Black-headed Jay
34	<i>Urocissa flavirostris</i>	Yellow-billed Blue Magpie
35	<i>Urocissa erythrorhyncha</i>	Red-billed Blue Magpie
36	<i>Dendrocitta formosae</i>	Grey Treepie
37	<i>Pyrrhocorax pyrrhocorax</i>	Red-billed Chough
38	<i>Corvus macrorhynchos</i>	Large-billed Crow
39	<i>Pericrocotus ethologus</i>	Long-tailed Minivet
40	<i>Dicrurus leucophaeus</i>	Ashy Drongo
41	<i>Cinclus pallasii</i>	Brown Dipper
42	<i>Myophonus caeruleus</i>	Blue Whistling Thrush

43	<i>Turdus albocinctus</i>	White-collared Blackbird
44	<i>Turdus bouboul</i>	Grey-winged Blackbird
45	<i>Muscicapa sibirica</i>	Dark-sided Flycatcher
46	<i>Ficedula superciliaris</i>	Ultramarine Flycatcher
47	<i>Eumyias thalassina</i>	Verditer Flycatcher
48	<i>Culicicapa ceylonensis</i>	Grey-headed Canary Flycatcher
49	<i>Luscinia brunnea</i>	Indian Blue Robin
50	<i>Phoenicurus frontalis</i>	Blue-fronted Redstart
51	<i>Enicurus scouleri</i>	Little Forktail
52	<i>Saxicola torquata</i>	Common Stonechat
53	<i>Saxicola ferrea</i>	Grey Bushchat
54	<i>Acridotheres tristis</i>	Common Myna
55	<i>Acridotheres fuscus</i>	Jungle Myna
56	<i>Sitta himalayensis</i>	White-tailed Nuthatch
57	<i>Certhia himalayana</i>	Bar-tailed Treecreeper
58	<i>Parus rubidiventris</i>	Rufous-vented Tit
59	<i>Parus melanolophus</i>	Spot-winged Tit
60	<i>Parus monticolus</i>	Green-backed Tit
61	<i>Parus xanthogenys</i>	Black-lored Tit
62	<i>Sylviparus modestus</i>	Yellow-browed Tit
63	<i>Aegithalos concinnus</i>	Black-throated Tit
64	<i>Delichon dasypus</i>	Asian House Martin
65	<i>Pycnonotus leucogenys</i>	Himalayan Bulbul
66	<i>Hypsipetes leucocephalus</i>	Black Bulbul
67	<i>Zosterops palpebrosus</i>	Oriental White-eye
68	<i>Tesia castaneocoronata</i>	Chestnut-headed Tesia
69	<i>Cettia fortipes</i>	Brownish-flanked Bush Warbler
70	<i>Cettia brunnifrons</i>	Grey-sided Bush Warbler
71	<i>Bradypterus thoracicus</i>	Spotted Bush Warbler
72	<i>Phylloscopus affinis</i>	Tickell's Leaf Warbler
73	<i>Phylloscopus maculipennis</i>	Ashy-throated Warbler
74	<i>Phylloscopus chloronotus</i>	Lemon-rumped Warbler
75	<i>Phylloscopus humei</i>	Hume's Warbler
76	<i>Phylloscopus trochiloides?</i>	Greenish Warbler
77	<i>Phylloscopus magnirostris</i>	Large-billed Leaf Warbler
78	<i>Phylloscopus occipitalis</i>	Western Crowned Warbler
79	<i>Phylloscopus reguloides</i>	Blyth's Leaf Warbler
80	<i>Seicercus burkii</i>	Golden-spectacled Warbler
81	<i>Seicercus xanthoschistos</i>	Grey-hooded Warbler
82	<i>Garrulax albogularis</i>	White-throated Laughingthrush
83	<i>Garrulax striatus</i>	Striated Laughingthrush
84	<i>Garrulax lineatus</i>	Streaked Laughingthrush
85	<i>Garrulax variegatus</i>	Variegated Laughingthrush
86	<i>Garrulax erythrocephalus</i>	Chestnut-crowned Laughingthrush
87	<i>Pnoepyga albiventer</i>	Scaly-breasted Wren Babbler
88	<i>Minla strigula</i>	Chestnut-tailed Minla
89	<i>Heterophasia capistrata</i>	Rufous Sibia
90	<i>Yuhina flavicollis</i>	Whiskered Yuhina

91	Aethopyga nipalensis	Green-tailed Sunbird
92	Aethopyga ignicauda	Fire-tailed Sunbird
93	Passer rutilans	Russet Sparrow
94	Motacilla cinerea	Grey Wagtail
95	Anthus hodgsoni	Olive-backed Pipit
96	Anthus roseatus	Rosy Pipit
97	Prunella strophia	Rufous-breasted Accentor
98	Carduelis spinoides	Yellow-breasted Greenfinch
99	Carpodacus nipalensis	Dark-breasted Rosefinch
100	Carpodacus rodochrous	Pink-browed Rosefinch

Annexure 5

Altitude reckoner

Altitude in metres (based on GPS readings)

Loharkhet	1684
Jhandidhar	2245
Ratapani	2543
Dhakuri top	2889
Dhakuri	2700
Khati	2248
Dwali	2601
Phurkia	3208
Pindari-Zero pt	3830
Khatia	3235
Kafni	3850

Annexure 4

Suggestion for building construction on the Pindari-Kafni trek route (those in bold are high priority)

<i>Name of location</i>	<i>Type of building</i>	<i>Purpose</i>	<i>Priority</i>
Song/Loharkhet	TO Quarter + Visitor center	Stay of patrolling staff + orientation center for visitors	II
Dhakuri	Double guard chowki + TO quarter	Forest guard residence for Dhakuri beat +stay of patrolling staff and officers	I
Dhakuri	Interpretation center	For interpretive facilities to visitors	III
Khati	Staff camp	Stay of patrolling staff	II
Dwali	TO quarter	Stay of patrolling staff and officers	
I			
Phurkia	Snow hut	-do-	II
Khatia	Snow hut	-do-	II
Jatoli beat	Forest guard hut I	Forest guard residence for Sunderdhunga	
Katholia	Snow hut	Stay of patrolling staff and officers	

SCOPE OF ECO-TOURISM IN UTTARAKHAND

*A.S. Negi, IFS (Rtd.)

Uttarakhand is the 27th State of Indian Union, borne on 9th November 2000 after reorganization of the State of Uttar Pradesh. The State has unique geographical, climatic and cultural diversity. It falls in the Western Himalayan region with altitudes above sea level varying from less than 300 meters to over 8500 meters. It may be the only State in the country in which subtropical, temperate, sub alpine, and trans-Himalayan climates could be found at such as short vertical distance. The State has wide range of snow peaks including Nandadevi, the second highest peak in India. The higher Himalayan regions of the State have large Glacial systems and Ganga, Yamuna, Ramganga and Kosi, the major river systems have their origin in the State. 65% of the geographical area of the State is under forests out of which nearly 44% has good forest cover. The State has a good network of Protected Areas with six National Parks and six Wildlife Sanctuaries. The world famous Corbett National Park created in 1936 has the distinction of being the first National Park of Indian subcontinent. Nandadevi WLS was notified in 1939 and was later elevated to the status of National Park in 1982. Rajaji WLS, which is now part of Rajaji National Park was established in 1948. Govind WLS came in existence in 1955. the State has 13.7% of its geographical area under Protected Area network as against a national average of 4.6%.

It is thus clear that the conservation history of the country has its roots in this small Himalayan State.

Out of about 4000 tiger population in the country, Uttarakhand alone harbors nearly 250 tigers in its PAs and other Reserved Areas. The Asian Elephants also has significant presence in the State with over 1000 elephants being recorded in the latest census. Uttarakhand population of tigers and elephants is the Northwestern limit population in their range. Apart from these two mega mammals the State has large range of rare and endangered mammals, birds, reptiles, amphibians, fishes, medicinal plants and other species of flora and fauna. The high altitude meadows are repositories of large variety of important medicinal plants. Musk deer is the State animal, Monal pheasant is the State bird, Braham Kamal is the State flower and the beautiful Rhododendron has been identified as the State tree of Uttarakhand.

Uttarakhand has been a tourist destination from 1883 when WW Graham attempted to enter the inner sanctuary basin of Nandadevi. These unsuccessful attempts continued during 1926, 1927 and 1932 when Eric Simpton and H.W. Tilman finally succeeded in 1934. In 1936, first successful expedition on Nandadevi peak was done. The exploration of Valley of Flowers was done

*Ex Chief Wild Life Warden Uttarakhand & Formerly Advisor Wild Life Govt. of Uttarakhand.

by Frank Smyth in 1931 who wrote the beautiful account of wild flowers found here in his famous book, 'The Valley of Flowers'. The rafting of Deodar timber from the forests of Tehri Estate by Wilson through river Bhagirathi was done in early nineties when he also constructed a huge timber bungalow at Harsil. Corbett National Park has been a tourist destination for nature lovers since pre independence days. The Tarai-Bhabar forests of Kumaon including Corbett National Park and Kumaon hills and parts of Garhwal were made world famous by Jim Corbett in his popular writings. Skendhu wrote an interesting account of his Mahaseer angling in his book 'The Mighty Mahaseer'. There was a chain of hunting blocks all along the foothills availed for hunting by several VIPs including some renowned English Viceroys and Governor Generals. Uttarakhand has been and shall always be a favourite destination for nature lovers, adventure seekers, writers, poets, peace lovers, wildlife enthusiasts and people of Hindu religion making pilgrimage to Chardham temples of Badrinath, Kedarnath, Gangotri and Yamunotri. The Gurudwara of Hemkund Sahib is visited by over 0.3 million Shikh and other devotees. The folk songs, folk dances, local customs and costumes are typical in different parts of the State. Majority of the people are honest, simple, contented and peace loving.

Eco-tourism is a tourist activity done in an ecologically sustainable manner by an environmentally aware visitor. This activity can also be used to educate the less aware or unaware visitors specially the younger generation. Of late there has been a general tendency to call every tourist activity as eco-

tourism activity to attract clientage but little care is taken to make it environmental friendly and sustainable. A visit to Protected Areas or forest areas is also generally termed as eco-tourism. Uttaranchal State as a whole is ecologically sensitive because of recent geological formation of Himalayas, its receding glaciers, which are the main source of our large river systems and the typical geographical features of the majority of the State. The forests and the Himalayas of the State moderate the national and global climate. Under such a situation every tourist activity in the state has to be environmental friendly and ecologically sustainable. In order to keep our rivers clean, keep our forests intact, save our valuable flora and fauna, reduce the rate of siltation of rivers every tourist activity has to be carefully and meticulously executed. Seventy seven percent of the PA network of Uttarakhand is in the high altitude area where strict regulations are not possible due to their tough geographical situation. The mountaineering expeditions outside PAs need the same degree of regulations.

Government of Uttaranchal has formulated its eco-tourism policy and it will be the second Himalayan State in the country to have formulated its mountaineering policy. Eco-tourism is ultimately going to be the main stake of this State with multifarious activities such as, visit to PAs, mountaineering, snow skiing, river rafting, trekking, outdoor/nature camping, angling by rod and line, rock climbing, botanical, zoological and geological study tours etc.

The promotion and regulation of ecotourism in the State of Uttarakhand is not only in the overall interest of the country but also for the regulation of global climate. The existing infrastructure of this small state with limited financial resources needs to be

reasonably expanded in order to promote and regulate the ecotourism. It is earnestly hoped that the Government of India and private entrepreneurs will come forward and strengthen the hands of the willing State Government.

Food habits of three major ungulate species in a semi-arid zone of Rajasthan, India

K.Sankar*, A.J.T.Johnsingh^{\$} and Reena Mathur⁺

Abstract

Between December 1988 and August 1990 the food habits of chital (*Axis axis*), sambar (*Cervus unicolor*) and nilgai (*Boselaphus tragocamelus*) were studied in Sariska Tiger Reserve, Rajasthan, India. Chital fed on 68 plant species, sambar 72 species, and nilgai 91 species. Contribution of various plant types (grass, herb, fallen leaves, flowers and fruits and browse) to the diet of all three herbivores varied from season to season. Among the preferred browse species *Capparis sepiaria* had the highest preference rating (chital 23.9, sambar 16.0 and nilgai 17.2). The dietary overlap between chital and sambar was 90 per cent, between chital and nilgai 93 per cent and between sambar and nilgai 92 per cent. Shifting of villages and removal of livestock from National Park area of the Tiger Reserve will reduce the competition for available food resources among wild ungulates.

Introduction

Little attention has been paid to concepts of adaptation and feeding strategy as for example the review for African ungulates by Jarman (1974) and on Indian ungulates by Rodgers (1988). Rodgers

(1988) identified four feeding styles among Indian ungulates. 1. Primary grazers. 2. Selective ground layer feeders. 3. Generalist and 4. Primary browsers. According to Rodgers (1988) sambar (*Cervus unicolor*) and nilgai (*Boselaphus tragocamelus*) can be classified as generalists and nilgai as browser. Chital (*Axis axis*) takes grass when palatable and available, switching to browse in the dry season; their general behaviour conforms to a grassland species for much of the year (large herd size, visual and auditory warning signals). Sambar are generalists as its distribution from Rajasthan to 3000 m in Himalayas to wet evergreen forests suggests. They take grass and browse opportunistically. The nilgai is a coarser browser, able to reach 2.2 m high (males), its large size means it can exist on much poorer quality food items. It is absent from the true arid zone where woody cover is inadequate to meet its requirements.

Research on food habits of sympatric ungulates has not progressed in India as it has in Africa (e.g. Talbot and Talbot 1962, Gwyne and Bell 1968, Leuthold 1970, Bell 1971, Jarman and Sinclair 1979). In India, Schaller (1967) has listed the food plants

*Wildlife Institute of India, P.O.Box # 18, Dehra Dun, Uttarakhand, 248 001, India. E-mail ID: sankark@wii.gov.in

^{\$} Senior Scientific Advisor, WWF-India and Eminent Wildlife Biologist, Nature Conservation Foundation, Mysore. E-mail ID: ajtjohnsingh@ncf-india.org

⁺ Department of Zoology, University of Rajasthan, Jaipur – 302 004, India. E-mail ID: rmzooprof@gmail.com

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of wild ungulates in Kanha. Berwick (1976) made cafeteria and field feeding trials on wild ungulates and cattle in Gir. Green (1985) has studied ungulate food habits in Kedarnath by faecal analysis. Haque (1990) studied wild ungulate food habits by direct observation on animals feeding and pellet analysis. Johnsingh and Sankar (1991) studied the food plants of wild ungulates and cattle in Mundanthurai based on direct field observations.

Study area

Sariska Tiger Reserve (76°17'-76°34'N and 27°5'-27°33'E) situated in the Aravalli hill range, is located in the semi-arid part of Rajasthan. The tract is mainly hilly, undulating and has numerous narrow valleys, two large plateau and two large lakes. The total area of the reserve is 881 km², of which 274 km² is the notified National Park (Core-I). The National Park area has 12 human settlements, which are due for relocation since 1987. According to Champion and Seth (1968) the vegetation of Sariska falls under 1. Tropical Dry Deciduous Forest and 2. Tropical Thorn Forest. The dominant vegetation types include *Anogeissus pendula* forest, *Boswellia serrata* forest, *Acacia* mixed woodland, *Butea monosperma* mixed forest, *Zizyphus* woodland, scrubland and riverine forest. The climate of the tract is subtropical, characterised by distinct winter (November to February), summer (March to June), and monsoon (July to August) and autumn (September to October). In winter the temperature drops to 0°C and in summer it rises as high as 47°C. The average annual rainfall is around 600 mm. The wild ungulate community of Sariska comprises

of chital, sambar, nilgai, chowsingha (*Tertracerus quadricornis*) and wild pig (*Sus scrofa*).

The study was conducted in the National Park area of the Tiger Reserve between December 1988 and August 1990 in order to answer the following questions.

1. What plant species were eaten by chital, sambar and nilgai?
2. What was the seasonal variation in the food plants eaten?
3. What was the dietary overlap among these ungulates?

Methods

Food habits of ungulates are often recorded by observing the plants eaten as the animal graze or noting the locations where animals grazed and later inspecting the site to see what plants were eaten (Wallmo *et al.* 1973). The first of these has been called the 'grazing minutes' or 'grazing seconds' method (Buechner 1950) and the second the 'feeding site method' (Lovaas 1958). Feeding site method was used to collect information on food plant eaten by chital, sambar and nilgai.

Four study areas were selected, one each in scrubland, *Butea* – mixed forest, *Zizyphus* woodland and *Anogeissus* forest for this study. The area searched was almost same (3.5 km²) for all the four habitats. Except in *Anogeissus* forest, which was covered on foot, in other areas feeding observations were done from a motor bike. When a feeding animal was located, it was observed from a distance varying from 10 to 50 m and recorded the food plants eaten. Then from radius of 5 m around the freshly eaten plant, the availability of shrub and tree species were recorded. No attempt was

made to quantify the grasses, herbs and fallen leaves, flowers and fruits. Irrespective of the species of all grasses, herbs and fallen leaves, flowers and fruits, they were considered as a separate category as 'Grass', 'herbs' and 'fallen leaves, flowers and fruits'. The height of the utilized plant and available plant species in 5m radius was recorded to see the difference in feeding level by chital, sambar and nilgai at different height classes. Program 'PREFER' (Prasad and Gupta 1991) was used to analyze the data.

Four hours each in morning and evening in a month (December, January, April, June, July and August) for two years were spent for each study area for feeding observations. In addition, one morning and one evening in a month were exclusively spent in *Anogeissus* forest to observe sambar feeding habits.

Dietary overlap among the ungulates was calculated using the method applied by Holmes and Pitelka (1968) by adding the total of the shared percentages of mutually exploited food items. Preference ratings for the food plants eaten were calculated by the method described by Petridges (1975). According to Petrides (1975) the preference value (P) of a food centers on 1.00 as a reference point. Species with preference value above 1.00 were those which were sought out as preferred food. Ratings below 1.00 represent forage species, which for some reason were neglected, and species with preference rating of exactly 1.00 were being eaten precisely in proportion to its abundance in the field.

Six quadrat frames (0.5 x 0.5 m size with 2 x 2 inch wire mesh on the top) were

placed under *Z. mauritiana* and *A. pendula* trees to collect the fallen leaves and fruits. Quadrat frames were kept under the tree prior the leaf fall (October 1989) and were removed soon after the fall was over (May 1990). Fallen leaves and fruits were collected once a week, sun dried and subsequently oven dried (60°C) and weighed. Nitrogen content in the leaves and fruits was determined by Kjaldhal method (Wilde *et al.* 1964). The values of the nitrogen expressed as percentage of dry weight were multiplied by a constant factor of 5.7 to obtain the percentage of protein (Horwitz 1970). Major browse plants were clipped during monsoon, winter and summer of 1989-90 and their percentage crude protein was estimated based on the method described above.

Results

Food habits of chital

Chital in total used 68 plant species: 10 trees, 4 shrubs, 8 creeper/stragglers, 29 herbs and 17 grasses (Appendix I). Out of 846 feeding observations obtained on chital, grass formed 46.3 percent, fallen leaves, flowers and fruits 41.8 percent, browse 9.8 percent and herb 2.1 percent of the diet (Table 1).

Table 1.

Contribution of various plant types to the diet of chital varied from season to season (Fig. 1). Fallen leaves, flowers and fruits formed 72.9 per cent and 77.2 percent respectively in first and second year winter in the diet of chital. In summer, contribution of fallen leaves, flowers and fruits to the diet of chital went down to 27.5 percent and 25.3 percent respectively in first year and

second year summer. Chital fed exclusively on grass during monsoon.

Fig. 1

In some cases chital avoided the vegetation parts of the herbs. For example young plants of *Cleome viscosa* and *Cassia tora* were avoided but their mature fruits were eaten by chital.

Among preferred browse species of chital, *C. sepiaria* had the highest preference rating (23.9) followed by *G. flavescens* (3.1) and *Z. mauritiana* (1.3) (Table 2).

Table 2.

Food habits of sambar

Sambar used 72 plant species, 26 trees, 6 shrubs, 5 creepers/stragglers, 21 herbs and 14 grasses (Appendix I). In total 638 feeding observations were obtained on sambar (Table 1). Sambar used 45.9 percent grass, 33.4 percent fallen leaves, flowers and fruits, 20.5 percent browse and 0.2 percent herb.

Sambar showed seasonal variation in its diet (Fig. 1). Browse and fallen leaves, flowers and fruits were intensively used during first and second year winter. Contribution of grass to the diet of sambar went up from 0 to 25 percent from first year winter to first year summer and 1.9 to 29 percent from second year winter to second year summer. Sambar fed largely on grass i.e. > 97.3 percent during monsoon.

Calculation of preference rating for the browse species (Table 3) of sambar showed that *C. sepiaria* (16.0), *G. flavescens* (5.4), *A. pendula* (1.4) and *Z. mauritiana* (1.5) were preferred.

Table 3.

Food habits of nilgai

Nilgai used 91 plant species, 20 trees, 9 shrubs, 12 creepers/stragglers, 29 herbs and 21 grasses (Appendix I).

Nilgai like chital, avoided vegetative parts of herbs. Only the pods of *C. viscosa* and *C. tora* were eaten by nilgai during winter months.

Out of 1233 feeding observations obtained on nilgai, grass formed 41.6 percent, fallen leaves, flowers and fruits 35.5 percent, browse 17.9 percent and herb 5 percent of the diet (Table 1).

Seasonal changes in the diet of nilgai are shown in Figure 1. Grass formed an important component of nilgai during monsoon (> 88.1%). Contribution of browse, fallen leaves, flowers and fruits and grass to the diet of nilgai during summer and winter did not vary much.

In the calculation of food preference ratings of browse species, nilgai showed preference for *C. sepiaria* (17.2), *Z. nummularia* (2.7), *Z. mauritiana* (1.8) and *G. flavescens* (1.2) (Table 4).

Table 4.

There were only three individual food plants in addition to grass, which were eaten by chital, sambar and nilgai in all the seasons. The dietary overlap between chital and sambar was 90 percent, between chital and nilgai 93 percent and between sambar and nilgai was 92 percent (Table 5).

Table 5.

Fallen leaves of *A. pendula* and fallen leaves and fruits of *Z. mauritiana* formed an important component in the diet of chital, sambar and nilgai during December, January and April. Leaf and fruit fall pattern of *A. pendula* and *Z. mauritiana* and percentage

crude protein of leaves and fruits are given in Figure 2 & 3. Peak *Anogeissus* leaf fall was observed during late December and gradually reduced towards the month of May. The percentage crude protein varied from 6 to 8.8 percent in *Anogeissus* leaves.

Fig. 2 & 3.

The *Zizyphus* leaf fall was low in December and January, Medium in February and March and high in April. The percentage crude protein varied from 3.9 in May to 10.5 percent in December. The *Zizyphus* fruit fall was very high in January and gradually reduced towards May. Percentage crude protein content in *Zizyphus* fruits varied from month to month. A very high protein content of 12.8 percent was observed during the first week of April 1990.

Discussion

Berwick (1974) reports that new succulent growth of woody plants which occur in hot dry seasons are very high in protein (10 to 15%). In Sariska the use of woody plants (browse) by sambar was more when compared to chital and nilgai in summer. Further, analysis of preference ratings and the dietary importance of browse species of chital, sambar and nilgai revealed that *C. sepiaria* (crude protein 10 to 14%), *G. flavescens* (crude protein 8 to 14%) and *Z. mauritiana* (crude protein 3.9 to 10.5) were the preferred plant species. The importance of *C. sepiaria* as a dry season fodder in Sariska has already been described by Rodgers (1990).

On the basis of their feeding habits Sariska ungulates can be divided into the following categories:-

1. *Dependent on grazing as long as green grasses are available but switch over to fallen leaves flowers and fruits in winter:* e.g. chital. Rodgers (1988) has categorized chital as a generalist feeder, which takes grass, herbs, and woody plants in its diet. Hofmann (1985) classified chital on the basis of morpho-physiological ruminant feeding types as an intermediate/mixed feeder.

2. *Dependent on grazing as long as the green grasses are available but switch over to browse and fallen leaves, flowers and fruits in winter and summer:* e.g. sambar. The food requirements of sambar are less specialized than those of other deer (Schaller 1967) and they will graze or browse depending upon the food availability (Bentley 1978, Kelton 1981, Ngampongsai 1987). Richardson (1972) reported that the diet of sambar greatly varied from large amount of browse in dry season to an almost complete dependence on grass and herbaceous plants in wet season in Texas. Young green grasses are the preferred forage of sambar in Kanha, but browse is often important during seasons when green grasses are scarce (Schaller 1967). During winter in Kanha 67 percent of the sambar rumen consisted of twigs and leaves (Schaller 1967). Analysis of faecal pellets of sambar in Kanha National Park revealed that browse was a dominant dietary component (Martin 1977). According to Dinerstein (1989) browse is an important food of sambar in Nepal.

3. *Mixed feeders: grazing, browsing and feeding on fallen leaves, flowers and*

fruits e.g. nilgai. The use of large number of food plants (91 plant species) and parts and the use of all kinds of food source (Grass, herb, fallen leaves, flowers and fruits) by nilgai in winter and summer when compared to chital and sambar clearly showed their mixed feeding habits.

Studies in Asia on nilgai food habits show that they are browsers (Berwick 1974, Mirza and Khan 1975, Dinerstein, 1979), in southern Texas they are grazers (Sheffield *et al.* 1983) and in Bharatpur (Haque 1990) they are mixed feeders.

Little information is available on the dietary overlap among chital, sambar and nilgai. Studies from Mundanthurai showed a 72.4 percent dietary overlap between chital and sambar (Johnsingh and Sankar, 1991). Study of food habits in Nepal (Dinerstein 1979) indicate that sambar competes with nilgai for browse. Compared to chital and sambar, nilgai have an advantage because they can reach higher. The use of grass and *C. sepiaria* which were eaten by chital, sambar and nilgai > 40 times, showed a significant difference in the feeding level at different height categories (Table 6). Among grass, chital preferred < 10 cm height class and avoided 11 to 25 cm and 25 to >50 cm height classes. Sambar and nilgai used all height classes of grasses in proportion to the availability. In the use of *C. sepiaria* chital showed a preference for 0.6 to 1m height class and avoided 1.6 to 2 m height class. Sambar and nilgai avoided < 0.5 m height class and preferred 1.1 to 1.5 m height class. The dietary overlap in Sariska during monsoon especially does not seem to have any adverse affect on any ungulate species as

the food resources are found in abundance. Though the dietary overlap observed among all the three ungulates was > 90 percent, 79 to 82 percent overlap was observed for grass and fallen leaves, flowers and fruits, in which the individual plant species overlap was not known.

Table 6.

All the three species preferred *Z. mauritiana* (leaves and fruits). The *Zizyphus* woodland community is distributed only in a few localities in the whole Tiger Reserve. Because of extensive lopping *Z. mauritiana* trees are not allowed to flower and fruit around the villages located in the National Park area of the Tiger Reserve. The regeneration of *Z. mauritiana* seedlings and the rate of survival are very low in Sariska (Sankar 1994). Relocation of 12 human settlements and livestock from the National Park area (274 km²) of the Tiger Reserve has already been due since 1984. But till date, the park authorities could not relocate successfully any of the human settlements from the notified National Park area. The estimated densities of chital, sambar and nilgai in the notified National Park area is 30.7/sq.km, 15/sq.km and 18.3/sq.km respectively (Sankar 1994) which is one of the highest in south Asia (Avinandan 2003). On an average, 8000 to 10,000 buffaloes, 3000 to 4000 cattle and 6000 to 8000 goats graze/browse inside the notified National Park area every day. Between 1988 and 2004 216% increase was observed in domestic buffalo population and 1628% increase was observed in goat population in Umri village located in Core-I (National Park area) (Sankar *et al.* 2005). Relocation of all human settlements and domestic

livestock from the notified National Park area of the Tiger Reserve would reduce the pressure on the forestland, improve the overall quality of the habitat and make more space available for the wild ungulates.

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Table 1: Food habitats of wild ungulates in Sariska (December 1988 – August 1990)

Species	Total # of observations	% Grass	% Herb	% Browse	% Fallen leaves, flowers and fruits
Chital	846	46.3	2.1	9.8	41.8
Sambar	638	45.9	0.2	20.5	33.4
Nilgai	1233	41.6	5.0	17.9	35.5

Table 2: Preference ratings and the dietary importance of browse species of chital in Sariska Tiger Reserve (April 1989 – August 1990)

Sl.#	Rank	Forage Species	Quantities		a) Available	(d) Diet	(p) Preference rating
			(A) Available	(R) Removed			
1	1	<i>Capparis sepiaria</i>	584	43	2.9	69.4	23.9
2	2	<i>Grewia flavescens</i>	274	12	6.2	19.4	3.1
3	3	<i>Zizyphus mauritiana</i>	675	2	2.5	3.2	1.3
4	4	<i>Zizyphus nummularia</i>	165	5	10.2	8.1	0.8

Total 1698 62

$\overline{SA}$ $\overline{SR}$

$$A = \overline{SA}/A \quad d = 100R/\overline{SR} \quad p = d/a$$

Table 3: Preference ratings and the dietary importance of browse species of sambarin Sariska Tiger Reserve (April 1989 – August 1990)

Sl.#	Rank	ForageSpecies	Quantities		a) Available	(d) Diet	(p) Preference rating
			(A) Available	(R) Removed			
1	1	<i>Capparis sepiaria</i>	934	58	3.3	52.7	16.0
2	2	<i>Grewia flavescens</i>	513	35	5.9	31.8	5.8
3	3	<i>Anogeissus pendula</i>	677	7	4.5	6.4	1.4
4	4	<i>Zizyphus mauritiana</i>	878	6	3.5	5.5	1.5
5	5	<i>Dendrocalamus strictus</i>	14	3	217.8	2.7	0.01
6	6	<i>Acacia leucophloea</i>	33	1	92.4	0.9	0.0009

Total

3049

110

SA

SR

$$A=SA/A \quad d=100R/SR \quad p=d/A$$

Sl.#	Rank	ForageSpecies	Quantities		(a)	(d)	(p)
			Available	Removed	(A)	(R)	Preference rating
1	1	<i>Capparis sepiaria</i>	934	58	3.3	52.7	16.0
2	2	<i>Grewia flavescens</i>	513	35	5.9	31.8	5.8
3	3	<i>Anogeissus pendula</i>	677	7	4.5	6.4	1.4
4	4	<i>Zizyphus mauritiana</i>	878	6	3.5	5.5	1.5
5	5	<i>Dendrocalamus strictus</i>	14	3	217.8	2.7	0.01
6	6	<i>Acacia leucophloea</i>	33	1	92.4	0.9	0.0009

SA

SR

Total

3049

110

Total

SA

SR

Total

3049

110

Total

Table 3: Preference ratings and the dietary importance of browse species of nilgai Sariska Tiger Reserve (April 1989 – August 1990)

Sl.#	Rank	ForageSpecies	Quantities		a) Available	(d) Diet	(p) Preference rating
			(A) Available	(R) Removed			
1	1	<i>Capparis sepiaria</i>	1059	80	3.1	53.3	17.2
2	2	<i>Zizyphus mummularia</i>	574	23	5.7	15.3	2.7
3	3	<i>Zizyphus mauritiana</i>	869	10	3.7	6.7	1.8
4	4	<i>Grewia flavescens</i>	305	20	10.7	13.3	1.2
5	5	<i>Acacia leucophloea</i>	114	5	28.5	3.3	0.1
6	6	<i>Balanites aegyptiaca</i>	129	3	25.2	2.0	0.08
7		<i>Capparis decidua</i>	97	3	33.5	2.0	0.06
8		<i>acacia catachu</i>	58	3	56.1	2.0	0.04
9		<i>puosopis julflora</i>	44	3	73.8	2.0	0.03

Total

3249

150

SA

SR

$$A=SA/A \quad d=100R/SR \quad p=d/a$$

Table 5: Dietary overlap between chital, sambar and nilgai in Sariska Tiger Reserve (December 1988 – August 1990)

Sl.#	Name of the plant species/ parts	Chital		Sambar		Nilgai		Overlap between Chital and Sambar	Overlap between Chital and Nilgai	Overlap between Sambar and Nilgai
		Freq.	% Freq	Freq.	% Freq.	Freq.	% Freq.			
1	Grass	391	46.8	293	47.4	513	44.3	46.8	44.3	44.3
2	Herb	18	2.2	1	0.2	61	5.3	0.2	2.2	0.2
3	<i>Zizyphus mauritiana</i>	3	0.4	11	1.8	12	1.0	0.4	0.4	1.0
4	<i>Capparis sepiaria</i>	58	6.9	61	9.9	114	9.8	6.9	6.9	9.8
5	<i>Grewia flavescens</i>	12	1.4	39	6.3	20	1.7	1.4	1.4	1.7
6	Fallen leaves, flowers & fruits	54	42.3	213	34.5	438	37.8	34.5	37.8	34.5
Dietary overlap								90.2	93.0	91.5

Table 6: The use of grass and *Capparis sepiaria* in different height categories by chital, sambar and nilgai in Sariska Tiger Reserve (December 1988 – August 1990)

GRASS

	Height Categories (cm)		
	0 – 10	11 – 25	25 – >50
Chital	P	A	A
Sambar	*	*	*
Nilgai	*	*	*

Capparis sepiaria

	Height Categories (m)			
	0.1 – 0.5	0.6 – 1	1.1 – 1.5	1.6 – 2
Chital	*	P	*	A
Sambar	A	*	P	*
Nilgai	A	*	P	*

P = Preferred: A = Avoided: * = Used in proportion to availability

Figure 1. Seasonal variation in the diet of wild ungulates in Sariska (Dec. 88 – Aug. 90)

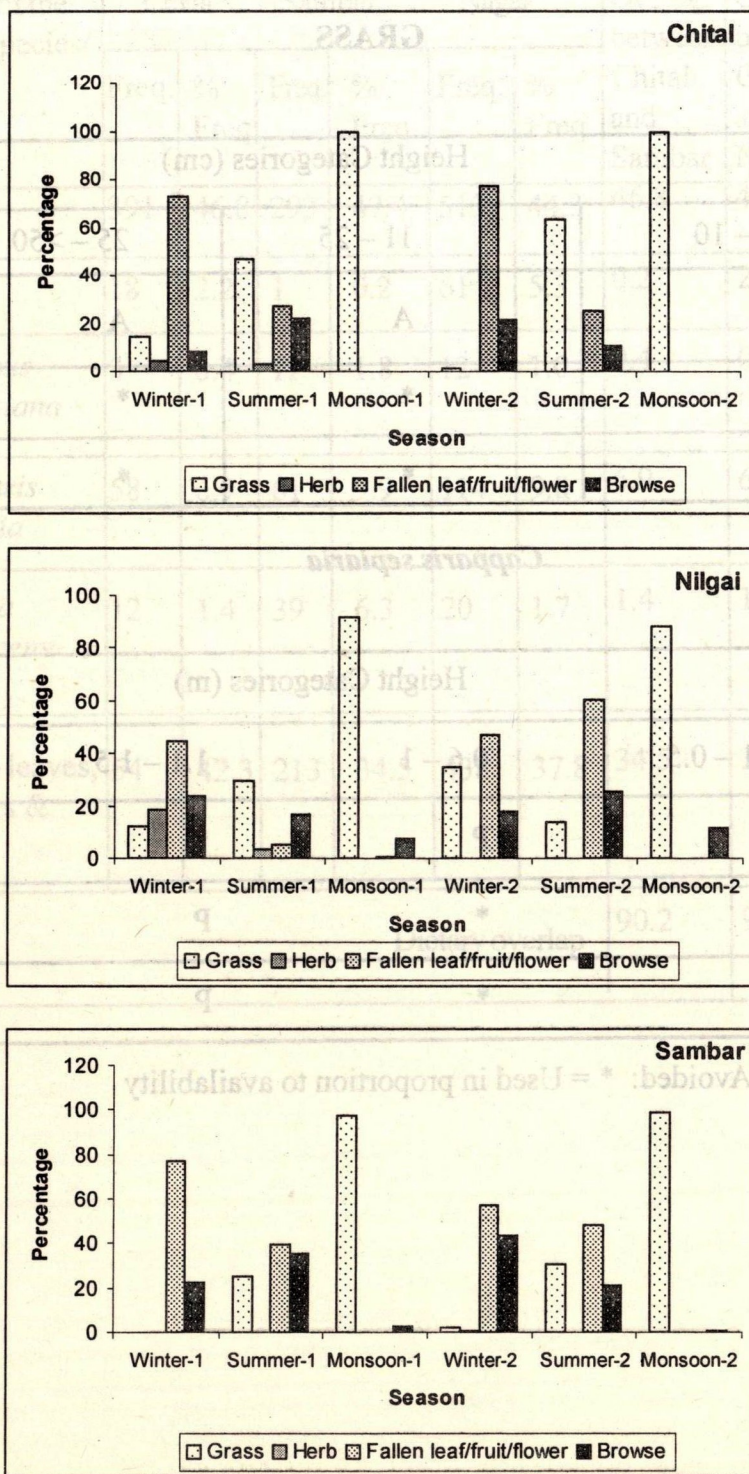


Figure 2. Leaf fall patterns and percentage crude protein in *Anogeissus pendula* (Dec. 89 - May 90)

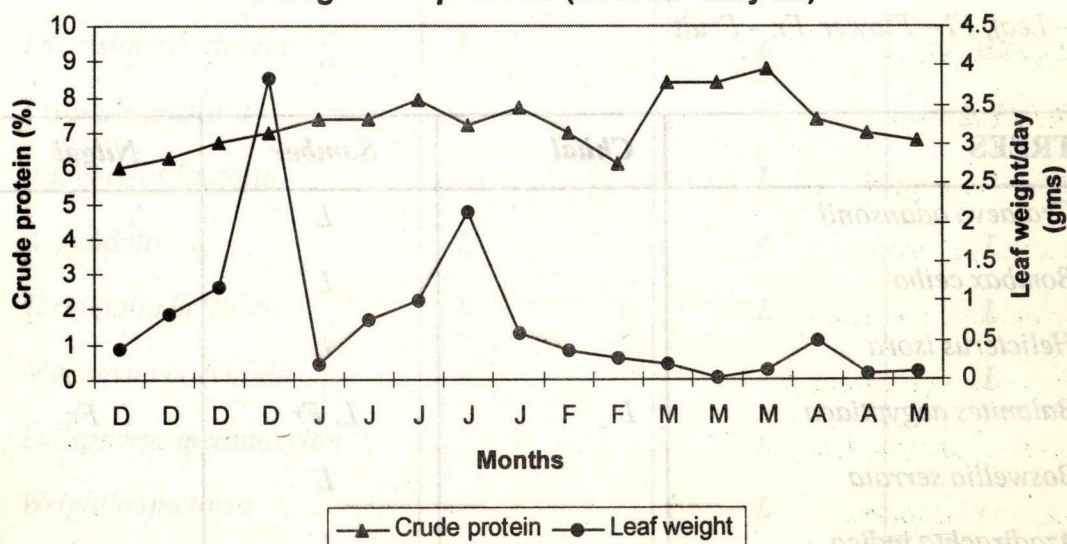
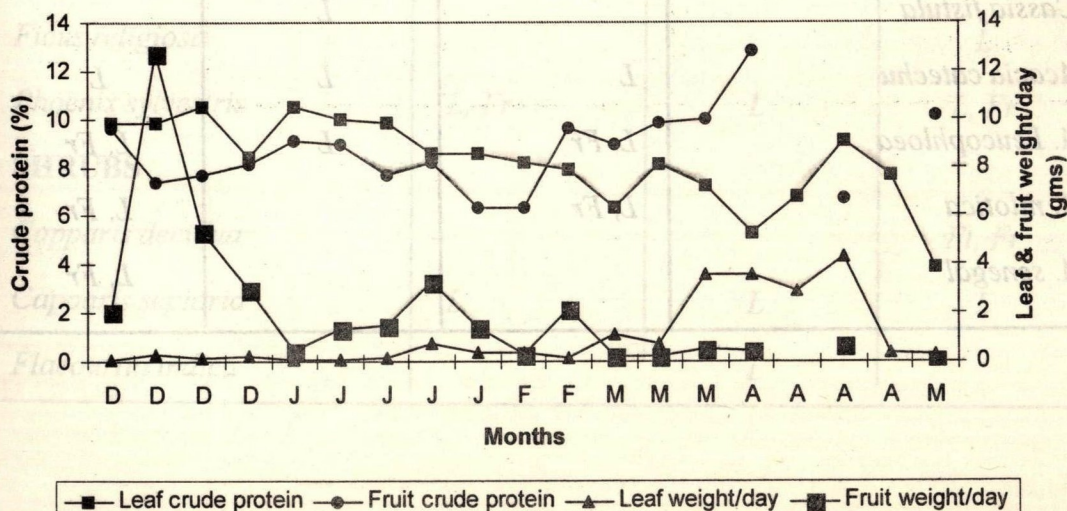


Figure 3. Leaf and fruit fall pattern and percentage crude protein in *Zizyphus mauritiana* (Dec. 89 - May 90)



Appendix 1: Food plants of chital, sambar and nilgai in Sariska Tiger Reserve (December 1988 to August 1990)

L – Leaf, Fl – Flower, Fr – Fruit

TREES	Chital	Sambar	Nilgai
<i>Crataeva adansonii</i>		L	
<i>Bombax ceiba</i>		L	
<i>Helicterus isora</i>		L	
<i>Balanites aegyptiaca</i>	L	L, Fr	L, Fr,
<i>Boswellia serrata</i>		L	
<i>Azadirachta indica</i>		L	
<i>Zizyphus mauritiana</i>	L, Fr	L, Fr	L, Fr
<i>Lannea coromandelica</i>		L	L
<i>Butea monosperma</i>	L, Fr	L, Fr	L, Fr
<i>Dalbergia sissoo</i>			L
<i>Bauhinia racemosa</i>		L	
<i>Cassia fistula</i>		L	
<i>Acacia catechu</i>	L	L	L
<i>A. Leucophloea</i>	L, Fr	L	L, Fr
<i>A. nilotica</i>	L, Fr		L, Fr
<i>A. senegal</i>			L, Fr

<i>Albizia lebbeck</i>			Fr
<i>A. odoratissima</i>		L	
<i>Dicrostachys cinerea</i>	L	L	L
<i>Prosopis juliflora</i>			L, Fr
<i>Anogeissus latifolia</i>		L	
<i>A. pendula</i>	L	L	L
<i>Terminalia bellirica</i>	L	L	L
<i>Mitragyna parvifolia</i>			L
<i>Diosphyrus melanoxylon</i>		L	
<i>Wrightia tinctoria</i>		L	
<i>Cordia dichotoma</i>		L	
<i>Ehretia leavis</i>		L	L
<i>Mallotus philipensis</i>		L	
<i>Ficus benghalensis</i>		L	
<i>F. glomerata</i>		L	
<i>Ficus sp.</i>			L
<i>Ficus religiosa</i>			L
<i>Phoenix sylvestris</i>	L, Fr	L	L, Fr
SHRUBS			
<i>Capparis decidua</i>			Fl, Fr
<i>Capparis sepiaria</i>	L	L	L
<i>Flacourtia indica</i>		L	

<i>Kydia calycina</i>		L	
<i>Grewia flavescens</i>	L	L	L
<i>Grewia ovalifolia</i>	L		L
<i>Limonia acidissima</i>		L	
<i>Zizyphus nummularia</i>	L, Fr	L, Fr	L, Fr
<i>Rus mysorensis</i>			L
<i>Indigofera tinctoria</i>			L
<i>Justicia adatoda</i>			L
<i>Clerodendrum phlomidis</i>			L
CREELPER/ STRAGGLER			
<i>Cocculus hirsutus</i>			L
<i>Pavonia zeylanica</i>			L
<i>Abrus precatorius</i>		L	
<i>Alysicarpus monilifer</i>	L		L
<i>Luffa acutangula</i>	L	L	L
<i>Trichosanthes cucumerina</i>			L
<i>Plumbago zeylanica</i>	L		L
<i>Ichnocarpus frutescens</i>	L	L	L
<i>Leptadenia pyrotechnica</i>	L		L
<i>Ipomoea pestigridis</i>	L	L	L
<i>Ipomoea sp.</i>	L		L

<i>Rivea hypocrateriformis</i>	L	L	L
<i>Cuscuta hyalina</i>			L
HERBS			
<i>Cleome viscosa</i>	Fr	L	L, Fr
<i>Abutilon indicum</i>	L	L	L
<i>Sida acuta</i>	L	L	L
<i>S. cordifolia</i>			
<i>S. rhombifolia</i>	L	L	L
<i>Corchorus aestuns</i>	L	L	L
<i>C. olitorius</i>	L	L	L
<i>C. trilocularis</i>	L	L	L
<i>Tribulus terrestris</i>	L		L
<i>Oxalis corniculata</i>			L
<i>Tephrosia purpuria</i>	L		L
<i>Cassia tora</i>	L, Fr	L	L, Fr
<i>Acanthospermum hispidum</i>	L		L
<i>Ageratum conyzoides</i>	L		L
<i>Bidens biternata</i>		L	
<i>Tridax procumbens</i>	L	L	L
<i>Vernonia cinerea</i>	L	L	L
<i>Physalis minima</i>	L	L	L
<i>Solanum sp.</i>	L		L

<i>Solanum xanthocarpum</i>	L		L
<i>Peristrophe bicalyculata</i>	L	L	L
<i>Boerhavia diffusa</i>	L	L	L
<i>Achyranthes aspera</i>	L	L	L
<i>Achyranthes bidentata</i>	L	L	L
<i>Aerva sanguinolenta</i>	L		
<i>Amarantus sp.</i>	L	L	L
<i>Acalypha ciliata</i>	L		L
<i>Euphorbia birta</i>	L		L
<i>E. prostrata</i>			L
<i>Commelina benghalensis</i>	L	L	L
<i>Cyanotis cristata</i>	L	L	L
<i>Cyanotis sp.</i>	L		L
GRASSES			
<i>Cyprus sp.</i>			L
<i>Allotropis cimiciana</i>	L	L	L
<i>Aphluda mutica</i>		L	
<i>Aristida adscensionis</i>	L	L	L
<i>Bothriochloa pertusa</i>	L		L
<i>Brachiaria distachya</i>	L	L	L
<i>Cynchrus setigerus</i>	L	L	L
<i>Chloris dolichostachya</i>	L	L	L
<i>C. barbata</i>	L		L

<i>Cyanodon dactylon</i>	L	L	L
<i>Dactyloctenium aegypticum</i>		L	L
<i>Dendrocalamus strictus</i>	L	L	L
<i>Dichanthium annulatum</i>	L	L	L
<i>Digitaria abludens</i>	L	L	L
<i>Eleusine indica</i>			L
<i>Eragrostis ciliaris</i>			L
<i>Heteropogon contortus</i>	L	L	L
<i>Seteria verticillata</i>	L	L	L
<i>Sorghum halepense</i>	L	L	L
<i>Sporobolus coromandelianus</i>	L		L
<i>Tetrapogon tenellus</i>	L		L
<i>Themeda quadrivalis</i>	L		L

बाघ — हमारा राष्ट्रीय पशु

नारायण सिंह नेगी*

1. प्रस्तावना

बिल्ली वंश की एक दर्जन से अधिक छोटी बड़ी प्रजातियां भारत में पाई जाती हैं इनमें से तीन बड़े आकार की प्रजातियां हैं, जो निम्न हैं :

	हिन्दी नाम	अंग्रेजी नाम	स्थानीय नाम	वैज्ञानिक नाम
1	बाघ	Tiger	शेर	Panthera tigris
2	शेर	Lion	बब्बर शेर	Panthera leo
3	गुलदार अथवा तेंदुआ	leopard or Panther	बघेरा	Panthera pardus

उपरोक्त तीनों प्रजातियों में से शेर जो आज से सौ साल पहले गंगा-यमुना के दोआब तथा सिन्ध नदी के किनारे मैदानी भागों में बहुतायत में पाया जाता था, अब केवल गुजरात के गिर वन में ही सिमट कर रह गया है। बघेरा अथवा तेंदुआ लगभग पूरे भारत में पर्याप्त संख्या में पाया जाता है। किन्तु बाघ, जो बिल्ली परिवार का सबसे सुन्दर पशु है, उसकी संख्या लगातार घटती जा रही है। यह हमारे लिये चिन्ता का विषय है। बाघ शौर्य, बल एवं सुन्दरता का एक अनूठा उपहार प्रकृति ने हमें दिया है। हम इसकी उपयोगिता को समझें और इसे एक हिंसक एवं डरावने जानवर के रूप में न देखकर इसकी सुरक्षा के लिए हर संभव प्रयास करें। बाघ प्राचीन काल से ही हमारी संस्कृति का अभिन्न अंग रहा है। दुर्गा के वाहन के रूप में यह हमारे लिये पूज्य है।

बाघ का पूर्व इतिहास

आज के संदर्भ में बाघ पर चर्चा करने से पहले यह उचित होगा कि हम उसके पूर्व इतिहास की जानकारी संक्षेप में पाठकों को दें। बाघ का इतिहास हजारों साल पुराना है। हमारे वेदों, पुराणों तथा लोक कथाओं में इसका उल्लेख है। आज से एक सौ वर्ष पूर्व बाघ की क्या स्थिति थी, उस पर उपलब्ध आंकड़ों के अनुसार विश्वभर में बाघ की निम्न आठ उप प्रजातियां मौजूद थी और ये सभी केवल एशिया महाद्वीप में कैस्पियन सागर से दक्षिण पूर्व में पाकिस्तान, भारत, नेपाल, भूटान, बंगलादेश, म्यांमार, वियतनाम, थाईलैण्ड, लाओस, कम्बोडिया, मलेशिया, जावा, बाली, सुमात्रा, चीन तथा रूस के साईबेरिया प्रान्त के बड़े भू-भाग पर बहुतायत से पाई जाती थी। एक मोटे अनुमान के अनुसार केवल भारतीय उप महाद्वीप में वर्ष 1900 में चालीस हजार बाघ थे।

* सीनियर फील्ड आफिसर, आपरेशन आइ आफ द टाइगर-इन्डिया, ग्रीन काटेज, बालाहिसार, मसूरी

क्र. सं.	उप प्रजाति	वैज्ञानिक नाम	विस्तार
1	बंगाल टाइगर	(<i>Panthera tigris tigris</i>)	भारतीय उप महाद्वीप
2	कैस्पियन टाइगर ★	(<i>Panthera tigris virgata</i>)	कैस्पियन सागर के तटीय प्रदेश
3	इन्डो चीन टाइगर	(<i>Panthera tigris corbetti</i>)	दक्षिण पूर्व एशिया
4	दक्षिण चीन टाइगर	(<i>Panthera tigris amoyensis</i>)	दक्षिण एवं मध्य चीन
5	साइबेरियन टाइगर	(<i>Panthera tigris altaica</i>)	उत्तर पूर्व चीन, कोरिया एवं सुदूर पूर्व रूस
6	सुमात्रा टाइगर	(<i>Panthera tigris sumatrae</i>)	सुमात्रा का इण्डोनेशियन द्वीप
7	जावा टाइगर ★	(<i>Panthera tigris sondaica</i>)	जावा
8	बाली टाइगर ★	(<i>Panthera tigris balica</i>)	इण्डोनेशिया के जावा तथा बाली द्वीप

बीसवीं सदी के उत्तरार्द्ध में उपरोक्त आठ प्रजातियों में से निम्न तीन विलुप्त हो गई जो आज अजायबघरों में भी उपलब्ध नहीं हैं ।

1. कैस्पियन टाइगर
2. जावा टाइगर
3. बाली टाइगर

इस प्रकार वर्तमान समय में विश्व में बाघ की केवल पांच उप प्रजातियां ही शेष रह गई हैं ।

बीसवीं सदी के पूर्वार्ध में राजा महाराजाओं तथा अंग्रेज शासकों के द्वारा बाघ का अंधाधुंध शिकार करने के कारण तथा द्वितीय विश्व युद्ध की समाप्ति के बाद जनसंख्या में भारी वृद्धि के कारण देश के तराई क्षेत्र का बड़ा भू-भाग खेती के लिए आबाद किया गया । घनी एवं ऊँची घास के कारण तराई का यह क्षेत्र बाघ के रहने के लिये बहुत उपयोगी था । इसके अतिरिक्त देश के विकास

के लिये नई सड़कों, बिजली लाइनों, नहरों एवं बांधों के निर्माण खदानों तथा उद्योगों के विस्तार के कारण जंगलों के क्षेत्रफल में कमी आने से बाघों की संख्या तेजी से घटती गई, जिसके फलस्वरूप 1970 तक देश में कुल दो हजार बाघ शेष रह गये ।

इस स्थिति से चिन्तित होकर भारत सरकार ने वर्ष 1973 में बाघ परियोजना (Project Tiger) का शुभारम्भ किया जिसके अन्तर्गत प्रारम्भ में 9 वन क्षेत्रों का प्रबन्ध खास तौर पर बाघों तथा उनके निवास स्थलों (Habitat) के सुधार को ध्यान में रखकर किया गया । वर्तमान में इनकी संख्या 28 है जिसके अन्तर्गत 38100 वर्ग कि०मी० क्षेत्र है तथा लगभग 1600 बाघ हैं ।

बाघ परियोजना के अन्तर्गत उपरोक्त वन क्षेत्रों तथा बफर जोन के बतौर उनके इर्द-गिर्द पालतू पशुओं की चराई हेतु छोड़े गये वन क्षेत्रों तथा आबादी वाले क्षेत्रों को सम्मिलित करते हुए लगभग

पचास हजार वर्ग किलोमीटर क्षेत्र का प्रबन्ध इस परियोजना में शामिल किया गया है ।

इस योजना के अन्तर्गत कई गांवों को संरक्षित वन क्षेत्रों से हटाकर उनकी सीमा से बाहर बसाया गया तथा बाघ परियोजना के अन्तर्गत वन क्षेत्रों पर पशुओं की चराई तथा जलौनी लकड़ी इकट्ठा करने पर रोक लगाने के साथ-साथ वन्य जन्तुओं का अवैध शिकार रोकने के लिए कड़े उपाय किये गये । इसके फलस्वरूप बाघों की संख्या में बढ़ोत्तरी हुई और वर्ष 1989 तक उनकी संख्या दुगुनी होकर देश में बाघों की संख्या चार हजार तक पहुंच गई । बाघ परियोजना के अन्तर्गत रखे गये वन क्षेत्रों में बाघों की संख्या सोलह सौ तक हो गई जो देश में कुल बाघों की संख्या का लगभग आधा से कुछ ही कम है । किन्तु वर्ष 1990 के बाद देश में बाघों की संख्या फिर घटने लगी । इसका एक बड़ा कारण जहाँ देश की जनसंख्या में भारी वृद्धि है वहीं दूसरा बड़ा कारण चीन तथा सुदूर पूर्व के देशों में बाघ की हड्डियों की बढ़ती हुई मांग है । इन देशों में बाघ की हड्डियों तथा विभिन्न अंगों को दवा बनाने में प्रयोग किया जाता है तथा ऐसा विश्वास किया जाता है कि इन दवाओं से हर तरह की बीमारियों का इलाज संभव है ।

प्रकृति संरक्षण हेतु स्थापित विश्व कोष (World Wide Fund for Nature) ने विश्व के उन सभी चौदह देशों को जिनमें बाघ पाये जाते हैं, सतर्क किया है कि यदि शीघ्र कड़े उपाय न किये गये तो इक्कीसवीं सदी के पहले ही दशक में बाघ विलुप्त हो जायेंगे ।

बाघ संरक्षण का महत्व

संसार में अनेक तरह के प्राणी हैं जिनका अस्तित्व एक दूसरे पर निर्भर करता है । बाघ की उपयोगिता समझने के लिये सर्वप्रथम इस

अटूट सत्य को समझना आवश्यक है । सृष्टिकर्ता ने संसार में जितने भी प्राणी पैदा किये हैं उनमें से प्रत्येक की भूमिका निश्चित की है । अतः यह समझना हमारी भूल होगी कि कोई भी प्राणी अनुपयोगी है । इस सत्य को प्राचीन काल में हमारे ऋषि-मुनियों ने समझा था । महान सम्राट अशोक ने भी इसीलिये अहिंसा पर बल दिया था । हमारे धर्म ग्रन्थों में छोटे-बड़े कई प्रकार के जीव जन्तुओं जैसे हाथी, शेर, बाघ, मछली, मोर, उल्लू, सर्प, चूहे आदि को ईश्वर का अवतार या अनेक देवी देवताओं के वाहन के रूप में महिमामंडित किया गया है । इसके पीछे यही भावना है कि हम सभी प्राणियों को आदर भाव से देखें ।

जैव विविधता किसी भी वन क्षेत्र के लिये पहली आवश्यकता है । जिस प्रकार तरह-तरह के छोटे-बड़े, पेड़ पौधे, झाड़ियाँ, घास, लताएँ तथा अन्य प्रकार की कई वनस्पतियाँ हमारे वनों को सुशोभित करती हैं, उसी प्रकार तरह-तरह के पशु-पक्षी उसकी शोभा बढ़ाते हैं ।

वनों में विभिन्न प्रकार के पशु-पक्षी तथा वनस्पतियों के होने से एक खाद्य श्रृंखला (food chain) का प्रादुर्भाव होता है जो वन के सभी प्राणियों के लिये लाभकारी होती है ।

उदाहरण के तौर पर हाथी जो हमारे वनों में रहने वाला विशालतम जानवर है, वह अपनी ऊँचाई या अपनी सूंड की पहुंच में आने वाली घास, बांस अथवा टहनियों को तोड़कर खाता है ।

घनी और ऊँची घास व झाड़ियों के बीच से जब हाथी जंगल में आता जाता है तो वह इनके बीच रास्ता बनाता है जिससे छोटे जानवरों का जंगल में आवागमन सुगम हो जाता है । सांभर, चीतल, काकड़, पाड़ा इत्यादि मृग अपनी-अपनी ऊँचाई की घास व लता-पत्ता खा लेते हैं तथा छोटी-छोटी

घास व जड़ी बूटियां, छोटे-छोटे जानवर जैसे खरगोश, स्याही आदि खा लेते हैं। ऊँचे पेड़ों के पत्ते फल फूल लंगूर व बन्दर खा लेते हैं तथा उन्हें तोड़ते समय जो भी फल फूल जमीन पर गिर जाते हैं, उन्हें मृग, सुअर, खरगोश आदि अन्य पशु खा लेते हैं। इस प्रकार वन के सभी पशु पक्षियों की भोजन व्यवस्था सुचारु रूप से चलती रहती है। जंगल में जैव विविधता का यही लाभ है कि सभी प्रकार की भोजन सामग्री जो उपलब्ध है उसका पूरा-पूरा उपयोग होता रहता है।

मांसाहारी पशुओं की खाद्य श्रृंखला (food chain) में बाघ शीर्ष स्थान रखता है। जब बाघ किसी जानवर का शिकार करता है तो उसे खाकर जो बच जाता है उससे सियार, सुअर, गिद्ध, कौवे, कछुवे आदि प्राणी अपना पेट भरते हैं। जो हड्डियां फिर भी बच जाती है, उन्हें लकड़बग्घे व सेही खा लेते हैं। इस प्रकार बाघ के साथ-साथ कई मांसाहारी प्राणी भी अपना पेट भरते हैं। आपने सुना या पढ़ा होगा कि आजकल लकड़बग्घे, गांवों में जाकर छोटे-छोटे बच्चों को अपना शिकार बना रहे हैं। समय-समय पर यह भी सुनने में आता है कि अमुक इलाके में बघेरा आदमखोर हो गया है। जब आस-पास के जंगलों में बाघों का अभाव होता है तो लकड़बग्घों को अपना भोजन नहीं मिलता है इसलिये ये आबादी की तरफ जाकर बच्चों का आखेट करते हैं।

यह ध्यान देने की बात है कि बाघ के लिये आरक्षित (प्रोजेक्ट टाइगर) वनों की सीमा के निकटवर्ती क्षेत्रों में आदमखोर बाघ, बघेरो या लकड़बग्घों का आतंक अन्य क्षेत्रों की अपेक्षा बहुत कम होता है। इसका मुख्य कारण यही है कि आरक्षित वन क्षेत्रों में जैव विविधता के कारण

सभी प्रकार के जीव-जन्तुओं की खाद्य आपूर्ति हो जाती है। अतः उन्हें बाहर जाने की आवश्यकता नहीं होती है।

बाघ मांसाहारी पशु होने के कारण शाकाहारी पशुओं की संख्या को नियन्त्रित करता है। वह उतने ही पशुओं को मारता है जितने उसके भोजन के लिये जरूरी हों। इस प्रकार बाघ जंगल के प्राकृतिक सन्तुलन (Ecological Balance) को बनाये रखने में अहम भूमिका अदा करता है।

इसके अलावा जिस जंगल में बाघ तथा अन्य मांसाहारी पशु रहते हैं वहाँ सभी शाकाहारी जीव स्वस्थ एवं सजग रहते हैं क्योंकि अस्वस्थ एवं बूढ़े शाकाहारी जीवों को बाघ या अन्य मांसाहारी जीव आसानी से मार लेते हैं। इस प्रकार बाघों की उपस्थिति से जंगल में बीमार अथवा पंगु जीव समाप्त हो जाते हैं।

बाघ को विश्व का सुन्दरतम पशु माना जाता है। यह विश्व के केवल चौदह देशों में पाया जाता है। जंगल इसका प्राकृतिक निवास स्थल है। यह घनी झाड़ियों एवं ऊँची घास में छिपना पसन्द करता है। इसे जंगल में देखने के लिये देश-विदेश से हजारों पर्यटक भारत आते हैं। इससे हमारे देश को विदेशी मुद्रा प्राप्त होती है तथा देशवासियों को रोजगार के अवसर मिलते हैं। कार्बेट टाइगर रिजर्व इसका एक उदाहरण है जहाँ देश विदेश से हजारों पर्यटक बाघ देखने के लिये आते हैं। पर्यटकों के आवागमन से जहाँ पर्यटन व्यवसाय बढ़ता है, वहीं टाइगर रिजर्व के निकटवर्ती लोगों को रोजगार के कई अवसर मिलते हैं तथा उनके आय के स्रोतों में वृद्धि होती है। कार्बेट नेशनल पार्क की सीमा पर स्थापित कई निजी टूरिस्ट रिजोर्ट इसका उदाहरण हैं।

आदि काल से प्रकृति मनुष्य के ज्ञान प्राप्ति का मुख्य स्रोत रही है। प्रकृति की गोद में रहकर मनुष्य ने प्रकृति के रहस्यों को जाना पहचाना है। कहने का तात्पर्य है कि मनुष्य ने जो भी ज्ञान प्राप्त किया है उसका मुख्य स्रोत प्रकृति ही है। यही कारण है कि हम मनुष्य के विशेष गुणों की उपमा वनों में विचरने वाले पशु पक्षियों से देते हैं। हथिनी जैसी मस्त चाल, मृगनयनी, कोकिला जैसी उपमा इसके उदाहरण हैं। वीर एवं साहसी पुरुष को हम शेर की उपमा देते हैं।

बाघ संरक्षण के लिए सरकार द्वारा किये गये उपाय

वन्य जन्तुओं को संरक्षण प्रदान करने के लिये सरकार द्वारा समय-समय पर कानून बनाये जाते हैं। अगस्त 1972 में भारत सरकार ने वन्य जन्तुओं के आखेट पर कुछ विशेष परिस्थितियों को छोड़ते हुए सारे देश में प्रतिबन्ध लगाते हुए एक अधिनियम बनाया जिसका नाम "वन्य जन्तु संरक्षण अधिनियम-1972" है। इसके अन्तर्गत बाघ तथा कुछ अन्य वन्य जन्तुओं को विशेष संरक्षण देने हेतु इन्हें सूची एक (Schedule) में स्थान दिया गया तथा इनके मारने, पकड़ने या हानि पहुंचाने को गम्भीर अपराध मानते हुए अपराधी को न्यूनतम छः माह के कारावास की सजा का प्रावधान रखा गया है। इस अधिनियम को अधिक प्रभावी बनाने के लिये वन विभाग के अधिकारियों, कर्मचारियों तथा पुलिस को अपराधियों की धर पकड़ तथा तलाशी के लिये व्यापक अधिकार दिये गये हैं।

वर्ष 1969 में नई दिल्ली में प्रकृति तथा प्राकृतिक संसाधनों की सुरक्षा के लिये गठित अन्तराष्ट्रीय संगठन (IUCN-World Conservation Union) की बैठक हुई जिसमें विश्व के कई वरिष्ठ प्रकृति प्रेमियों ने बाघ

की घटती हुई संख्या पर गहरी चिन्ता प्रकट की। तत्कालीन प्रधानमंत्री स्वर्गीय इन्दिरा गाँधी ने इस विषय पर गहरी दिलचस्पी ली। भारतीय वाइल्ड लाइफ बोर्ड ने एक विशेष टास्क फोर्स का गठन कर उससे बाघ को बचाने हेतु सुझाव देने को कहा। वर्ष 1972 में इस टास्क फोर्स ने बाघ को बचाने के लिये कुछ ठोस सुझाव प्रस्तुत किये। इसके फलस्वरूप वर्ष 1973 में भारत सरकार ने प्रमुख अन्तराष्ट्रीय संगठनों की सहायता से बाघ परियोजना (Project Tiger) का शुभारम्भ किया। भारत में आज अट्ठाइस वन क्षेत्रों का प्रबन्ध बाघ परियोजना (Project Tiger) के अन्तर्गत किया जा रहा है, जिनका कुल क्षेत्रफल 38,100 वर्ग कि०मी० है और उनमें देश में पाए जाने वाले कुल लगभग 3500 से 4000 बाघों में से आधे बाघ रहते हैं।

वन्य जन्तु संरक्षण अधिनियम 1972 में बाघ के शिकार पर पूर्ण प्रतिबन्ध लगाने के अलावा उसकी खाल, हड्डियों, नाखूनों तथा मूछों के रखने तथा उनके व्यापार पर भी पाबन्दी लगा दी गयी है। बाघ परियोजना के अन्तर्गत लिये गये क्षेत्रों में लकड़ी काटने तथा पशुओं को चराने पर भी प्रतिबन्ध लगाये गये हैं, ताकि इन क्षेत्रों में मनुष्य तथा पालतू पशुओं के आवागमन से कोई व्यवधान उत्पन्न न हो तथा वहाँ की वनस्पति तथा वन्य जीवों की सुरक्षा सुनिश्चित की जाये। इन क्षेत्रों में वन रक्षकों तथा वन्य जन्तु रक्षकों द्वारा प्रभावी गश्त तथा संचार व्यवस्था भी सुदृढ़ की गई तथा वनों को आग से बचाने के लिये भी समुचित प्रबन्ध किये गये। इन सब प्रयासों के फलस्वरूप स्थिति में सुधार हुआ है तथा बाघों की संख्या भी बढ़ी है। बड़े बड़े वन क्षेत्रों को आपस में जोड़ने व बाघों के आवागमन व प्रजनन को

बढ़ावा देने के लिये कारीडोर व सम्पर्क स्थापित करने के प्रयास किए जा रहे हैं।

बाघ को विशेष महत्व देने तथा उसके संरक्षण हेतु भारत सरकार ने बाघ को "राष्ट्रीय पशु घोषित किया है।

बाघ संरक्षण में अन्तर्राष्ट्रीय सहयोग

बाघ संरक्षण में अन्तर्राष्ट्रीय सहयोग नितान्त आवश्यक है। इसके दो प्रमुख कारण हैं। पहला कारण यह है कि जिन चौदह देशों में इस समय बाघ मौजूद हैं, उनमें अधिकांश देशों की सीमाएँ एक दूसरे से मिली हुई हैं। यदि एक देश में बाघ संरक्षण पर अच्छा काम किया जाता है और उसके पड़ोसी देश में बाघ का शिकार किया जाता है या बाघ संरक्षण कार्य में लापरवाही की जाती है तो इसका बुरा असर सभी देशों पर पड़ता है। जहाँ एक देश की सीमा दूसरे देश में मिली हुई है, वहाँ बाघ संरक्षण के लिये उन सभी देशों में समान कानून हों। दूसरा कारण यह है कि चीन तथा सुदूरपूर्व एशियाई देशों में बाघ की खाल, हड्डी तथा उसके शरीर के अन्य अंगों की बहुत मांग है क्योंकि बाघ की हड्डियों तथा अन्य अंगों की विभिन्न रोगों के उपचार हेतु इन देशों में दवायें बनाई जाती हैं और यह विश्वास व्याप्त है कि इन दवाओं से लगभग सभी प्रकार के रोगों का उपचार संभव है। अतः यह बहुत आवश्यक है कि बाघ की खाल, हड्डी तथा उसके अंगों के अवैध व्यापार को रोकने के लिये सभी देशों में समान कानून बनाया जाय तथा इस कानून पर प्रभावी तौर से अमल हो।

अन्तर्राष्ट्रीय कन्जर्वेशन संस्थाओं ने बाघ को पूरे विश्व की अमूल्य धरोहर मानते हुए - बाघ संरक्षण के काम में उल्लेखनीय काम किया है। इन संस्थाओं में विश्व वन्य जन्तु कोष (World

Wildlife Fund) तथा प्रकृति तथा प्राकृतिक संसाधनों के संरक्षण के लिये समर्पित अन्तर्राष्ट्रीय संस्था आई०यू०सी०एन० प्रमुख है। इन संस्थाओं ने बाघ परियोजना (Project Tiger) की सहायता के लिये ऑपरेशन टाइगर (Operation Tiger) के माध्यम से धन एकत्र करने का अभियान चलाया है ताकि बाघ को बचाने के लिये पूरे एशिया में समान उपाय किये जायें।

विश्व में बाघ के अलावा कुछ और वन्य जीवों के अस्तित्व को भी खतरा हो गया है तथा यदि समय पर इनको बचाने के कारगर उपाय नहीं किये गये तो इनके विलुप्त होने का खतरा मंडरा रहा है। इस स्थिति से अवगत होते हुए विश्व भर के प्रकृति प्रेमियों के द्वारा आयोजित अन्तर्राष्ट्रीय सम्मेलन

(International Convention on International Trade in Endangered Species) की सिफारिशों के फलस्वरूप विश्व भर में बाघ की खालों तथा उसकी हड्डियों के व्यापार पर प्रतिबन्ध लगाया गया जिससे स्थिति में पर्याप्त सुधार हुआ है। विश्व भर में अधिकांश देशों ने बाघ को बचाने में दिलचस्पी ली है। इस प्रकार इस काम के लिये एक साझा मंच स्थापित हो गया है।

अमेरिका की नेशनल फिश एण्ड वाइल्ड लाइफ फाउण्डेशन (National Fish and Wildlife Foundation) तथा इक्जोन कॉर्पोरेशन (Exxon Corporation) जो अमेरिका की और विश्व की सबसे बड़ी पेट्रोलियम कम्पनी है, ने सितम्बर 1995 में एशिया में बाघों को बचाने हेतु एक कोष (Save the Tiger Fund (STF)) की स्थापना की है। अकेले इक्जोन कॉर्पोरेशन ने पांच वर्ष की अवधि के लिये

पचास लाख अमेरिकी डालर संरक्षण हेतु देने की घोषणा की है। विश्व भर में किसी भी संस्था द्वारा दिया गया यह सर्वाधिक धन है। इस कोष के लिये स्कूलों में पढ़ने वाले छात्रों को लेकर आम आदमियों तथा व्यापारी वर्गों से धन एकत्र किया जा रहा है। कोष की स्थापन के डेढ़ साल की अवधि में ही इस कोष में चार लाख अमेरिकी डालर जमा गये थे और इस अवधि में इस कोष से तीन लाख तीन हजार अड़तालीस हजार अमेरिकी डालर 41 बाघ परियोजनाओं को दिये गये।

इस प्रकार बाघ संरक्षण के लिये पर्याप्त अन्तर्राष्ट्रीय सहयोग मिल रहा है जो बाघ के भविष्य के लिये अच्छा संकेत है।

बाघ संरक्षण में देश के नागरिकों के सहयोग का महत्व

जैसा कि पहले कहा जा चुका है कि किसी भी योजना की सफलता, बिना जन सहयोग के संभव नहीं है, उसी प्रकार बाघ संरक्षण का काम भी बिना जन सहयोग के संभव नहीं है। प्रकृति तथा प्राकृतिक संसाधनों की सुरक्षा का काम इतना सरल नहीं है कि कोई भी सरकार इसे बिना जन सहयोग के कर सके। इसलिये बाघ संरक्षण को सफल बनाने के लिये जन सहयोग की नितान्त आवश्यकता है। बाघ हमारा राष्ट्रीय

गौरव है, इसलिये इसकी रक्षा करना देश के हर नागरिक का कर्तव्य है।

बाघ को बचाने का यह सुनहरा अवसर है क्योंकि इस काम में पूरा विश्व एवं अनेक अन्तर्राष्ट्रीय संस्थाएँ सहयोग दे रही हैं। बाघ परियोजना के अन्तर्गत आरक्षित टाइगर रिजर्व क्षेत्रों के निकटवर्ती ग्रामीण इस महान कार्य में अपना अमूल्य योगदान दे सकते हैं। चोर शिकारियों की गतिविधियों की जितनी जानकारी निकटवर्ती ग्रामीणों को होती है उससे अधिक किसी और को नहीं हो सकती है। यदि ग्रामीण अपने क्षेत्र में आने वाले संदिग्ध व्यक्तियों की गतिविधियों पर निगरानी रखें और निकटवर्ती वन कर्मचारियों अथवा अधिकारियों को चोर शिकारियों के सम्बन्ध में सूचनाएँ देते रहें तो बाघ संरक्षण का कार्य काफी सफल हो सकता है। इसके साथ-साथ निकटवर्ती वनों को आग से बचाने में भी ग्रामीण अपना अमूल्य योगदान दे सकते हैं।

बाघ प्रकृति की अमूल्य देन है। इसकी सुरक्षा करना हम सबका कर्तव्य है। आइये, हम सब मिलकर प्रकृति की इस अमूल्य धरोहर को आने वाली पीढ़ियों के सुपुर्द करने में कामयाब हों। याद रखिये कि यदि इस अमूल्य धरोहर की, हम रक्षा नहीं कर पाये तो यह हमेशा-हमेशा के लिये हमारे देश से लुप्त हो जायेगी।

A Short Report on *Cordyceps sobolifera*, another “Yarsa Gumba” from a Himalayan Biosphere Reserve, India.

M.P.S. Bisht*, Manish Mehta and S.K. Nautiyal

ABSTRACT

A new species of *Cordyceps* i.e. *Cordyceps sobolifera* is reported for the first time in the Nanda Devi Biosphere Reserve, Uttarakhand Himalaya. It is a parasitic fungus which grows over *Cicada* sp. in grasslands between the altitudes of 2800m amsl to 3600m amsl in the buffer zone of Nanda Devi Biosphere Reserve. Unlike a *Cordyceps sinensis* (Tibetan name ‘Yarsa Gumba’, locally known as ‘Keera Jari’) which is widely collected from Nepal and eastern part of Uttarakhand, this species has long ascarps (fruiting bodies), which pour out from the bodies of *Cicada* nymphs, a soil dwelling root parasite. *Cicadas* suck juice from tree roots at the larval stage. In the present communication discussions are being made of the physical characteristics and the habitat identification of the fungus. It is also suggested that there is an urgent need to promote further scientific exploration and detailed research on biological screening of this fungus.

Key words: *Cordyceps*, Biosphere Reserve, Parasite, Fungus, Ascarps.

Some economically valuable fungal species like *Cordyceps sinensis* and *Morchella esculenta*¹ are widely distributed in the forest floors and grasses of alpine

meadows rich in humus in areas of the Nanda Devi Biosphere Reserve (Fig.1) and are illegally exploited either by local people or by National and International traders. Official records of NDBR Director’s office at Joshimath (Uttarakhand) shows that during 2003-04 total 12 Nepalese and recently in 2006 four locals were caught and punished by forest officials for illegal collection of these fungi along with other medicinal herbs from the protected areas of NDBR. According to Park Managers and other conservationists these poachers overexploit the natural resources without considering sustainability and proper scientific methods. Which further leads to gradual deterioration of such vegetal wealth in a time scale.

The chemical constituents of *C. sinensis* were first studied by Chatterjee *et al.* in 1957. A crystalline substance was isolated and named “cordycepic acid”, and was then identified by Sprecher and Sprinson as D-mannitol. Further studies on the chemical constituents of *Cordyceps* revealed the presence of a series of known substances particularly N⁶-(2-hydroxyethyl)- Adenosine and Cordycepin (3¹deoxyadenosine). *Cordyceps* contains a wide variety of potentially important constituents, including polysaccharides, ophiocordin (an antibiotic compound), cordycepin, cordypyridones, nucleosides, bioanthracenes, sterols, alkenoic acids, and

* Corresponding Author Department of Geology, HNB Garhwal University, Srinagar (Garhwal)

exo-polymers, These fungal species now proved to be of high medicinal values (a well known Chinese herbal medicine) as anti-aging, pro-sexual, anti-cancer and immune boosting. Research has also shown that it may be useful in the treatment of cardiac arrhythmia, angina pectoris, liver disease and cancer. It is a building block for Gene repair in cell replication. It plays an important role in ATP, AMP (energy) metabolism.

In the recent past rapidly increasing its national and international market price (Rs. 1,25,000 to 1,30,000 per kg) and the number of scientific reports/articles on the medicinal values of these fungi forced wild material gatherers to over exploit them. It is now high time to promote further detail scientific exploration and research on biological screening of the Indian strains of these fungi and techniques for its large scale cultivation.

ANOTHER YARSA GUMBA

Identically looking, a group of 10-15 cm long ascocarps, pinkish and purple coloured fungus that attacks over the nymphs of *Cicada* spp. (locally known as Jhingur) leisurely devouring its host (Fig.2) can easily be recognised in the chunks of shady green grass lands or the sub alpine pasture lands surrounded by Burch and Rhododendron forest at the altitude of 2800 to 3200m in Nanda Devi Biosphere Reserve. It is like a *Cordyceps sinensis* (Berk) Saac (Tibetan name 'Yarsa Gumba', Chinese name 'Dong Chong Xia Cao' and locally known as 'Keera Jari') (Fig 3), a parasitic fungus. Unlike *C. sinensis*, it has also long fruiting body (10 to 15 cm) sprouting out from different parts of insect. The insects live in colonies at the depth of 4-5 centimeter in the unconsolidated soils. The soils over the de-

bris slopes are full of green turf and other grasses surrounded by forests. These Cicada nymphs hibernate in the ground, make burrows and take juice from root of meadow herbs. After a week or so gradually the growth of the mycelium pours out from the victim's body. In the early stage of the development of fungus the fruiting body looks like a single filament with small funnel shaped tip, which later on converted into small bulbous head and in final stage these burst out and disperse all the ascospores out of it (Fig. 2_{a,b,c}). The ascocarp is soft and fleshy and can easily be picked out from the soil along with dead insect. In nature there are number of parasitic fungal species already reported on the larva of moth and other bugs like *Cordyceps australis*, *Cordyceps curculionium*¹⁰ and *Cordyceps sphecocephala*¹¹. but this is first time when *Cordyceps sobolifera* is reported from this part of country. The identification of sample was carried out by Dr. Harry C Evans, Principal Scientist, Invasive Species Management, CABI Bioscience UK Centre (Ascot), Silwood Park, Ascot, Berks SL5 7TA, United Kingdom.

AREA PROFILE

Nanda Devi Biosphere Reserve (NDBR) is located in the upper Alaknanda catchment (Latitudes 30° 6' N to 31° 5' N and Longitudes 79° 16' 30" E to 80° 17' 15" E) which covers parts of the Camoli, Bageshwar and Pithoragarh Districts, Uttarakhand. It includes rivers like Saraswati, Khirganga, Laxamanganga, Rishiganga, Dhauliganga, Girthiganga and part of Pindar and Gori Ganga basins. The NDBR is bordered by the part of Pindari catchment in its southern boundary and is marked by the Indo-Tibetan border in north. In the east it is bounded by the

Bambadhura pass, Kigri pass, Kala Glacier to Milam Glacier and on western margin lies the Upper Alaknanda catchment from Satopanth to Vishnuprayag. The entire reserve covers approximately 5860.69 sq. km. Area. It was declared as Biosphere Reserve on 18th January, 1988 under the UNESCO's Man and Biosphere (MAB) Programme. NDBR consist of two central core zones, viz. Nanda Devi National Park covering Rishiganga catchment (683.4 Km².) and "Valley of Flowers National Park" (87.5 Km²), is located in the upper

reaches of Bhyundarganga, a tributary of Alaknanda. Both the core zones have the status of National Park and have been declared as "World's heritage sites" in 1992 and 2005 respectively. Physiographically the rugged mountainous terrain with variation in climatic zones the NDBR contributes to existence of a number of unique vegetation types and biodiversity. The reserve is a repository of a large number of flora and fauna of high economic values.

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Fig. 1. Nanda Devi Biosphere Reserve (Uttaranchal Himalaya)

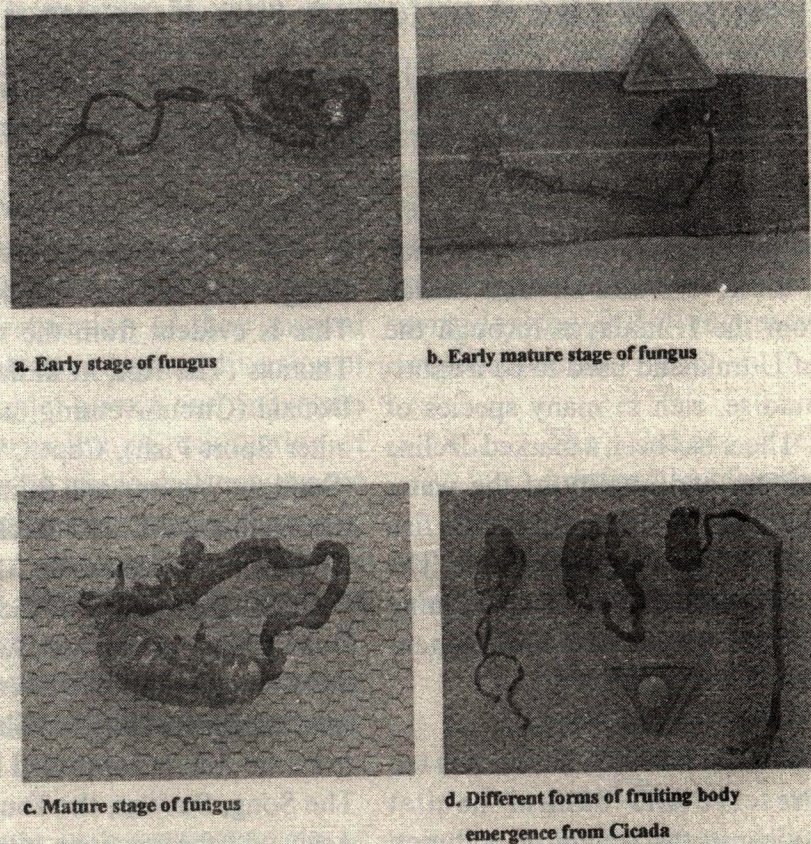


Fig. 2: Different stages of *Cordyceps sobolifera* growing on Cicada.

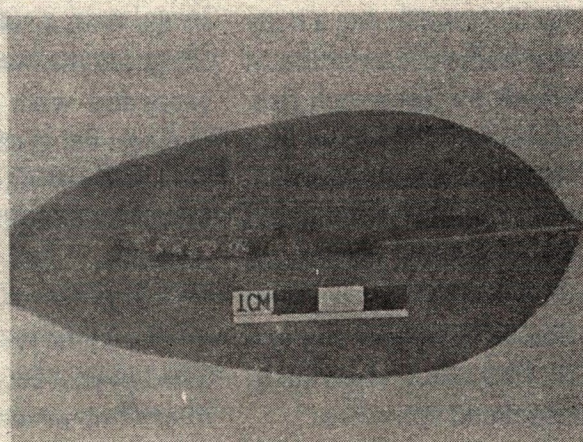


Fig. 3: *Cordyceps sinensis* (= Keera Jari = Yarsa Gumba) widely exploited fungi with high economic potential from NDBR.

The Role of the Angler in the Preservation of Sport Fish in Uttarakhand Rivers

*RK Jasbir Singh, Lt. Gen (Retd.)

The pristine, sparkling, oxygen-rich waters of the rivers and streams which tumble from the Himalayas through the foothills of Uttarakhand used to be a sport-fishing paradise, rich in many species of game fish. There has been a marked decline in the quantum and quality of the water habitat, and in the population of game fish in the rivers and streams of the State. The deterioration is accelerating at an alarming pace, with the game fish facing near extinction.

Steps must be taken before it is too late to preserve the natural habitat remaining-cleanse the waters of pollution to improve its quality, and put a stop to the wanton destruction of fish and fry. Anglers in particular are vitally interested in conserving game fish and improving the quality of sport fish. They are in fact a body with a personal stake in the preservation of the environment which nurtures such fish. Anglers Clubs and Associations have thus a vital role in the revival of the sport fish. The Environment & Anglers' Association founded in 1985, with the sole purpose of helping in the conservation of the ecosystem and the conservation of fish stocks is one such NGO, which has been vigorously involved in all such related activities.

In the past fish were plentiful in the Ganges and Jamuna and their tributaries. This is evident from the writings of HS Thomas (*The Rod in India*), A.St. J Mac Donald (*Circumventing the Mahseer and other Sport Fish*), Capt CWS Conway (*Sunlight Waters*), and from old records of the Dehra Dun, and back issue of the *Cheetal* published by the Wild Life Preservation Society of India. The Dehra Dun Fishing Association, which controlled the fishing around the Doon Valley in the Sixties, reported large catches of sport fish from the waters controlled by the Society. The Song, Suswas, the Tons, the Giri, the Asan, with the junctions of these rivers with the Jamuna and Ganges, were particularly note-worthy. Anglers of the Environment & Anglers' Association have corroborated that some of the finest fishing was found in the waters of the rivers of the Valley. Large catches were regularly reported and recorded with some 40 lb and above mahseer being caught. In the Anglers Book kept at Tajewala on the Jamuna, a mahseer of 57 lb caught by a young captain is recorded.

In the present most of these species listed in past records are still found in our rivers but in severely depleted quantity.

* Member, The Environment & Anglers' Association
8 Mohini Road, Dehradun

Some of the species have totally disappeared from the tributaries of the Jamuna and the Ganges. The scene today is dismal. The reasons are discussed below.

The population of sport fish, and indeed of many fresh water food fish, has been, and continues to be, decimated by the large scale destruction of their natural habitat, through damming and diversion of waters into hydel-power and irrigation systems, water pollution, destruction of spawning beds by whole scale removal of gravel, and consequent silting of the rivers, by wanton destruction through indiscriminate netting of fry, dredging the rivers with loop snares and worst of all, dynamiting and electrocution, sparing nothing, not even breeding stock and small fry.

Of course, in suggesting courses of action for the conservation of sport fish certain factors must be taken into consideration –

- Development cannot be stopped. Dams and irrigation canals will continue to be constructed in the name of progress.
- No fool-proof methods will be found to completely eliminate pollution of our vast water resources which sustain the fish.
- Villages living in the vicinity of rivers will continue to depend on the fish as a rich source of protein, and must be made beneficiaries of any conservation methods advocated. Without their active involvement no such scheme will succeed.

- Government agencies have neither the will nor the resources to dedicatedly implement any scheme which in their view benefits only a few sport people.

If the Government of Uttarakhand is serious about saving the mahseer and other sport fish then they may have to consider the following measures for implementation:-

1. The lakes created by impounding of water as a result of construction of dams, etc., should be utilized for stocking and breeding of game fish. Such schemes have been successfully implemented by developed countries, and have paid rich dividends in the way of providing recreation, encouraging tourism and angling and above all providing an additional source of food for the people since fish are migratory they will spread out to rejuvenate the rivers. THE TELCO scheme for propagation of the mahseer is worthy of emulation.
2. All dams must have inbuilt fish ladders or fishways, which must be regularly maintained, to allow fish to migrate to their spawning grounds.
3. Villagers living in the vicinity of rivers must be encouraged to make small ponds to be stocked with food fish, so that their

dependency on the rivers for extracting fish is minimized.

4. Viable stretches of water should be selected and reserved for sport fishing-cum-tourism, preferably under the strict control of recognized fishing associations and government agencies (eg forest and tourism). These will eventually act as foci for fish breeding. Fish will then spread to the connecting rivers and streams. The reserve waters controlled by the Wild Life Association of India (WASI) AND LATER Tiger Tops in the Cauvery, which eventually the Karnataka Government took over, and turned into a highly successful fishing-cum-tourist resort, is a fine example of how successful such schemes can be. The half-baked scheme where the Uttarakhand Government has divided a stretch of about 15 KM of the Ramganga amongst four parties, though a step in the right direction, is unworkable, for the simple reason that the Forest Ministry has missed the woods for the trees. The Deed drawn up for "leasing" the small stretches to each party is more of commercial nature than for the conservation of the mahseer. The small stretches allotted besides being economically unviable (keeping guards to prevent poaching, and other

expenses, are crippling for NGOs like the Environment and Anglers' Association with no source of income), will tend to be over-fished and thus defeat the very purpose of ensuring that the few fish remaining migrate to other parts of the waters of the State.

5. Strict enforcement to prevent poaching and destruction of fish by such illegal methods as use of explosives, electrocution, use of small mesh nets, snares, poison, etc. Spawning grounds and brood fish and juveniles need to be given special protection. If the forest/fisheries departments cannot afford to supplement their staff for this purpose, it can be done by NGOs, provided a pragmatic approach for allocation of stretches of the rivers, on the lines of the Karnataka government and other countries is made.

6. The possibility of allotting stretches of river to rafting outfits, where their camps are located, should be examined. Rafting outfits which cover long stretches of the rivers are ideally suited for monitoring the rivers for illegal activities. If provided with communications like mobile phones, they can report such activities to the Forest Dept for immediate action.

From all this it is evident that the true anglers have a vital role to play in the conservation of sport fish and its habitat. Unless immediate measure are taken to protect our great sport fish, we will lose irretrievably one of our major source of food supply and tourist attraction – The Mahseer.

There must be active participation of anglers' association/clubs in all schemes undertaken by the authorities for the conservation of sport fish from the outset. Similarly, the involvement of the villager dependent on rivers for their livelihood in such schemes is a must, if any scheme is to succeed.

Sport fishing is a multi-billion rupee industry (as an erstwhile Tourism Minister had said, it is a "Sleeping Giant") and angling as a sport has the potential for not only attracting own and foreign tourists, but also for stepping into the highly lucrative international market engaged in the manufacture of fishing gear. All this can be achieved provided the first step is taken : save the great Mahseer and other sport fish and their habitat, and all will fall into place.

From the Archives of "Cheetal"

The Indian Board of Wild Life.

A critical review

S.A. Shah

I. INTRODUCTION.

The Indian Board of Wild Life may be described as a 'child of India's independence'. After 1947, with the general reorganisation of her institutions, the Government of India commenced an examination of India's forest policy, which had stood from 1898. This forest policy declaration had contained no reference to wild life, and India's top foresters realised that this was an omission.

At the same time the efforts of Colonel R.W. Burton, a retired Indian Army Officer and a veteran sportsman-conservationist in India, working with the support of the Bombay Natural History Society, were being directed to focus attention on the perilous position to which India's wild life had come after the war. He urged the creation of separate game departments to take over the care of wild life, asserting that the forest departments of the country had failed to protect the game animals and birds of India and were too preoccupied with other duties to do so; this suggestion was naturally resisted by the forest authorities of the country, led by the 'chief forester' of India, the Inspector General of Forests.

While this discussion was going on, the Advisory Committee for Co-ordinating Scientific Work in India appointed, in 1951,

a subcommittee of leading sportsmen and wild life enthusiasts "to examine and suggest ways and means of setting up National Parks and Sanctuaries for the conservation of the rich and varied fauna in India". The Committee felt that no substantial or lasting progress in protecting wild life could be achieved in the absence of "a permanent central organisation assisted by an advisory committee, to coordinate wild life." This was the genesis of the Indian Board of Wild Life.

The board was inaugurated at Mysore in December, 1952, the Government and the Maharaja of Mysore playing host to the delegates, who, apart from the Chief Conservators of Forests of all the States, included representatives of the Bombay and Bengal Natural History Societies, some leading conservationists and the Director of the Zoological Survey of India. The meeting was presided over by the Maharaja of Mysore, but the motivating force was provided by the then Inspector General of Forests, the dynamic Shri M.D. Chaturvedi, I.F.S. Under his guidance the deliberations, which lasted three days, covered the whole ground thoroughly, by separate committees dealing with various subjects-the *Steering Committee* entrusted with the work of coordinating the work of other committees; the *Administrative Committee*

to discuss and recommend changes in the constitution and composition of the board, indicate ancillary state organisations and suggest ways and means for financing the organisation to be set up; the *Legislation Committee* to take stock of existing laws and rules and other measures for the protection of wild life and to suggest modifications and new measures to be adopted and also to recommend measures in respect of publicity and liaison; the *National Parks Committee* to deal with national parks and sanctuaries, zoological parks and gardens and protected animals and the *Trophies Committee* to consider the topics of export and import of animals and animal products.

A constitution was drawn up for the board and formulated by the Government of India in their Resolution No. 7-110/51-R., dated the 4th April, 1952. The Chairman of the board is the Maharaja of Mysore, there being two Vice-Chairmen in the persons of the Inspector General of Forests to the Government of India and Maharaj kumar Dharmakumar Sinjhi of Bhavnagar. There is a Secretary-General in the person of the Director of the Zoological Survey of India and an Honorary Secretary who is a permanent official in the Ministry of Agriculture at Delhi. There are four Regional Secretaries for north, south, east and west, M.D. Chaturvedi, H.H. of Sandur, E.P. Gee and Maharajkumar Dharmakumar Sinjhi of Bhavanagar respectively. The Chief Conservators of Forests of all States in India constitute the main membership of the board and in addition there are representatives of the Bombay and Bengal Natural History Societies, the Bird Watching Society of Delhi, the Wild Life Club of the Forest Colleges, Dehra

Dun etc.

It will be thus seen that the board is primarily a Government-nominated advisory body, whose recommendations form the basis of the suggestions made from time to time to State Governments on matters concerning wild life. The presence on the board of selected sportsmen and conservationists, either in their personal capacities or as representatives of organisations with similar or parallel objectives, ensures that the public viewpoint is not overlooked and that acceptable recommendations based on sound, practical lines are made.

The board, in addition, has a Bird Wing and a Zoo Wing, the members of which are all specialists in their field, to advise on matters concerning the protection of bird-life and the management of zoological gardens in India, respectively.

Under the terms of the Government declaration, the board is to meet every two years and it has met twice so far (apart from the inaugural meeting), once in Calcutta in 1955 and again in Delhi in 1958. The main work of the board is carried out by its Executive Committee, which comprises of the Chairman, the two Vice-Chairmen, the Secretary General, the Honorary Secretary and the four Regional Secretaries. Actually, the day to day work is done by the Inspector General of Forests and the Honorary Secretary of the Board, who are located in Delhi.

The Executive Committee is to meet once in six months and so far it has met six times, as follows, incidentally setting a useful convention by meeting in sanctuaries by rotation.

1953. In Kanha Sanctuary, Madhya Pradesh.

1955. Twice, Jan-Feb, in Calcutta and May in Ootacamund.

1956. In the Gir Sanctuary, Saurashtra.

1957. In the Periyar Sanctuary, Kerala.

1959. In the Shivpuri Sanctuary, Gwalior.

Since the protection of wild life, along with the management of the forests of India, is a responsibility of the States, the Government of India on the advice of the board had asked the State Governments to form their own wild life boards to advise them on policy in connection with wild life matters. So far the following States have formed such boards:-

Assam, Bengal, Bihar, Orissa, Manipur, Tripura, N.E.F.A., Madhya Pradesh, Rajasthan, Bombay, Madras, Mysore, Andhra, Jammu and Kashmir, Punjab, Himachal Pradesh, and Kerala.

The State wild life boards are composed of both officials and selected nonofficials and are under the chairmanship of the Ministers of Forests, with the Chief Conservators of Forests as the secretaries. The regional secretaries of the Indian board are also members of State boards in their respective jurisdiction. State boards are expected to refer questions to the central board and in turn to accept and implement, where possible, the recommendation of the Govt. of India, which are based on the decisions and resolutions of the main board.

A close liaison is meant to be secured between the State boards and the central board through the respective regional secretaries, but this has not materialised in practice. More-over, the States have been generally slow in implementing the recommendations of the Indian Board of Wild

Life. Meetings of the State boards have in some cases not been held for long periods (viz., Assam and Bihar) while other States have not yet formed boards, notably U.P. This, to a great extent, has stultified the work of the central board, nor can much be done without the co-operation, enthusiasm, and initiative of secretaries of State boards, i.e. the Chief Conservators of Forests, who are the 'key-men' in the whole set-up.

II. REVIEW OF THE WORK OF THE BOARD

For the purposes of this review the work of the Board may be conveniently classified as under:-

1. Publicity and Education.
2. National Parks and Sanctuaries.
3. Protection of Individual Species.
4. Wild Life Legislation.
5. Research.

1. Publicity and Education.

Realising that no amount of legislation is of use unless there is a strong backing of public opinion, the board organised, in 1955, Wild Life Day. This was a success and from the next year the festival was extended to a Wild Life Week, to be celebrated as far as possible in the first week of October. The week is devoted to publicity and propaganda for the preservation of wild life and for education of the young, by taking them to sanctuaries and zoos and by talks, cinema shows etc.

The board has published, through the Government of India, some booklets, such as "India's Wild Life", "Why Preserve Wild Life." etc. etc. Other works which are under print are "Our Animals" and "A Guide to Field Censuses." A wild life wall

map for schools and institution was brought out by a Calcutta firm of publishers under the directions of the Zoological Survey of India.

The board has recommended the preparation of documentaries and the establishment of a film library, but no progress has been so far made in this direction.

In its 3rd Session (1958) the board recommended that Nature Lovers' Clubs, Societies and Associations should be established in Universities and other institutions and States have been asked to sponsor such organisations and assist them financially. So far, no progress is discernible in this direction, however.

In 1956, the board organised an All-India Essay Competition on Wild Life and an All India Exhibition of Wild Life Pictures. Unfortunately, nothing like this has been repeated since.

The wild life conservationist is emphatic in stating that the greatest damage to wild life is being done by crop-protection guns. The board has discussed and recommended various measures to prevent the destruction of wild life by this means, but little progress has been achieved.

As a part of the education drive, the board recommended that illustrated brochures dealing with national parks and sanctuaries be brought out and distributed freely. One such booklet is "Keoladeo Ghana, Bharatpur", brought out by the B.N.H.S.

The zoo wing suggested that professional zoologists be appointed in zoos as guides and 'question-houses' be established in all zoos. In order that zoos may function efficiently and to the maximum advantage of the public, a zoo manual is

under preparation by the zoo wing.

2.National Parks and Sanctuaries.

Suggestions for the creation and management of national parks and sanctuaries have been an important activity of the board. In the very first year of its existence, it recommended that 18 national parks be created, either new or by conversion of existing sanctuaries. Of these only the Kanha National Park and the Shivpuri National Park in Madhya Pradesh and the Hazaribagh National Park in Bihar have been created. The board has prepared a model bill in respect of national parks for the guidance of States.

In 1957, the Vth meeting of the Executive Committee of the board recommended that "a separate warden and other staff, with special aptitude to man wild life sanctuaries and State parks, was desirable". The recommendation has only partially been implemented by some States and not at all by others.

The creation within a sanctuary of an 'Abhyaranya' or 'sanctum-sanctorum', where complete immunity from disturbance is assured to wild life, was recommended by the board but has not been given effect to in any of the States except Mysore (Bandipur Sanctuary) and Madras (Madumalai Sanctuary), as far as is known.

States can expect assistance from the Centre to the extent of 50% of their development expenditure on sanctuaries and national parks and several States are taking advantage of this, notably the U.P., Madras and Bihar. Impressive buildings, including look-out towers, and roads etc. are being erected in sanctuaries for the benefit of the public, but in most cases the wild life is

missing, having become severely depleted or being still subjected to poaching and disturbance from exploitation.

The board recommended that in all the river valley projects, the authorities concerned should, in the first instance, declare a suitable area surrounding the project as a 'protected area', in order to encourage water birds and other animals. Specific mention was made of Tungabhadra dam and Nagarjunasagar. This suggestion has yet to be implemented by State Governments.

3. Protection of Individual Species.

Preservation of species threatened with extinction has been one of the most important activities of the board. The lion, the one-horned rhinoceros, the swamp deer and the wild buffalo have all been recommended for complete protection. The *thamin* or brow-antlered deer has been protected by creating a sanctuary in Manipur. The pink-headed duck and the *cheetah* or hunting leopard are extinct, though they are included in the list of protected species. Although the board has recommended that the great Indian bustard be completely protected, it is still being shot while the Kashmir stag or *hangul* has not yet been declared completely protected in its parent State.

One of the notable recommendations of the Indian Board of Wild Life was for the insurance of the future of the Indian lion by the provision of alternative homes for this animal, which is now confined to the Gir forest. As the result of the U.P. Government offering Chandraprabha Sanctuary near Varansi as a new home, three lions were transplanted in 1957 to this area and released in a specially fenced enclosure. At the time of writing, the experiment can nei-

ther be said to have either failed or succeeded, and only time will tell. Species which have been recommended for protection, completely or partially, are:

(1) snow leopard, (2) clouded leopard, (3) Indian wild ass, (4) musk deer, (5) pigmy hog, (6) black buck, (7) Indian gazelle, (8) four-horned antelope, (9) flamingo, (10) grey jungle fowl, (11) pea-fowl, (12) Jerdon's courser, (13) mountain quail, (14) caracal, (15) Indian swamp deer, (16) Phillip's rusty-spotted cat.

4. Wild Life Legislation.

The question of having efficient and up-to-date legislation for the protection of wild life in the various States was one of the first problems before the board. There is need for revision of existing laws and rules and the necessity for special and adequate legislation to effectively protect wild life. The Bombay Wild Birds and Animals Protection Act of 1951, which is a comprehensive piece of legislation concerning all areas and all types of exploitation of wild life and backed up by the whole State machinery, was suggested as a model for other States to follow.

A model National Parks Bill for the guidance of States wishing to create national parks was drafted and sent to the States. The southern regional secretary drafted a model Wild Life Act for the southern region States.

Unfortunately, only a few States have revised their wild life legislation upto now and in many States the old rules under the Indian Forest Act for the Reserved Forests and the Wild Birds and Animals Protection Act for the remaining areas are continuing. The last named act is practically a 'dead letter' in most States.

Indirect protection to wild life in India is afforded through controls under the Sea Customs Act on the export of wild animals and birds and their products, such as skins, feathers, horns etc. This has been arranged in 3 categories:

Completely banned for export.

Export banned except as specimens for bonafide educational or scientific research institutions, at the discretion of the Secretary General, Indian Board of Wild Life.

Export for commercial and other purposes allowed under permits. By the association of the Secretary General of the board with the export departments, the board ensures that the export rules are implemented.

It is the opinion of the board that wild life has suffered not so much from the lack of legislation as from the absence of proper machinery to implement the existing laws. Therefore, in 1958 the board recommended the establishment of separate wild life services in the States. But except in some States where special game staff on a limited scale exists, mainly for the protection of sanctuaries, this recommendation has not been implemented.

5. Research.

As far as wild life research is concerned, we have yet to make a beginning in our country. The present state of our knowledge regarding the life history, habits, habitats and economic importance of our birds and other animals is so meagre that no scientific management is possible.

Research regarding the habits of animals, the role of each species in the balance of nature, the conditions of the habitat

necessary for each species, and the number of each species necessary for maintaining and perpetuating the race in a balance with its surroundings, are all important matters which need well planned investigations spread over a number of years.

Censuses and surveys play a very important part in the scientific management of wild life resources, including control of species where necessary. It is a matter of great importance to us in India to be able to speedily and cheaply survey and census our wild life, and a beginning has yet to be made on these lines.

The board does not have any facilities by way of staff and funds to conduct research. The board, therefore, requested the Zoological Survey of India to conduct ecological studies in respect of important mammals, such as the one-horned-rhinoceros and the lion. The progress is very slow because no funds have been provided for the purpose.

III. CONCLUSION

The Indian Board of Wild Life, during its short period of existence of about 7 years, must be credited with having made several important recommendations to the Government of India which in turn has passed most of them on to the States, but comparatively few have been implemented. The reasons are not far to seek. Since the Indian Board of Wild Life functions as a purely advisory body and since wild life is a State subject, the State Governments are not bound to accept and implement the resolutions passed by the former. The power and authority of the board are, thus, restricted. Moreover, the board does not have any funds of its own and has to depend on the

Government of India for even expenditure of a fundamental nature. However, it would be wrong to convey the impression that the board and its chief associates are not conscious of its limitations. Actually, it has made recommendations for creation of a 'wild life fund' and to amend the Indian Constitution so as to empower the Government of India to enforce the implementation of its decisions, but the Government of India have been unable to do anything in the matter so far.

In our country, we have started wild life preservation very late, and for this mistake we have paid a heavy price in the form of some precious animals viz., cheetah, mountain quail and pink headed duck having been lost to us. Therefore, the strengthening of the authority of the I.B.W.L. in order to make it a more effective organisation brooks no delay.

The board needs a technical establishment of its own. In fact, in order to deal with a country of this size, regional establishments would be necessary. What should be the composition of these establishments is for the experts to decide. To start with, perhaps the well established Zoological Survey of India may have a special wing to deal with problems referred to it by the I.B.W.L. Then a wild life ecology branch at the Forest Research Institute, working in collaboration with and through State forest departments, suggests itself.

With the expansion of the activities of the board, it appears that more technical subcommittees are necessary. Immediately, committees for national parks and sanctuaries, for wild life legislation and for publicity and education are indicated. Subsequently others may be necessary as follows:

1. Censuses and Surveys.
2. Ecological studies.
3. Fishing.

As a result of the expanded activities of the Board and the widespread interest created by it, the Government of India are of the opinion that the constitution framed for it in 1952 needs revision. This matter was discussed at the Vth Meeting of the Executive Committee (1957) but the new constitution has not yet been finalised.

The scope of the board could, with benefit, be changed so as to make it a national counterpart of the I.U.C.N. (International Union for the Conservation of Nature and Natural Resources). Wild life cannot be preserved without maintaining and, if possible, improving its habitat. Therefore, the board to be effective has to maintain close liaison and cooperation and integrate its efforts with those of the Central Board of Forestry, the Soil Conservation Board and the Indian Council of Agricultural Research.

It appears that coordination at the central level for all matters relating to wild life is difficult and leads to delays. It was, therefore, suggested by Shri Ranganathan in 1956 that regional conferences would make for quick disposal and quick execution. One such conference was held in Mysore in 1956 for the southern region. This might be made a regular feature for all the regions. It appears to be necessary to have a uniform pattern of close seasons for a region and group close seasons for several species and this could be worked out for different regions.

Though a certain improvement in the position of wild life is discernible in some

of the areas in charge of forest departments, nothing is being done to improve matters outside forest areas. The board may do well to focus attention and make practicable suggestions in this respect, though unless there is a adequate staff to take care of these areas, mere legislation would fail to achieve the desired results. Here we come up against the greatest obstacle, for States are extremely reluctant to spend money on game protection, the solitary exception being the Punjab, where there is a separate department for the areas outside the reserves.

In the matter of publicity and education, much ground remains to be covered. It is essential to concentrate on the youth of the country and, therefore, youth organisations such as the Bharat Scouts, the Girls' Guide Association of India, The N.C.C., A.C.C., universities, colleges and schools must be enthused to take up nature-study. In order to initiate and interest the younger generation in the matter of wild life, youth hostels and youth

camps would prove invaluable. It may be mentioned that no other field of scientific investigation is as interesting and absorbing as the study of living animals, where even an ordinary person can, without any elaborate equipment, make worthwhile contributions. The youth of India has energy, zeal and industriousness. What is wanting is interest. Therefore, it rests with the I.B.W.L., being a national organization, to undertake measures calculated to achieve this objective.

But no single organisation can sufficiently gear the community to ensure adequate, nationwide consciousness of wild life. The work of the Indian Board of Wild Life must be backed up by societies and associations for the preservation of wild life, which must bring pressure to bear, through force of public opinion, on State governments, with whom the task finally rests

Cheetal

Quarterly News

Wildlife Preservation Society of India enrolls more Members

As a result of overwhelming response from Institutions & individuals, the Society continued to increase its membership during this quarter as well. One more young student member from Haridwar joined the society. The following members, who opted for different kind of membership are warmly welcomed to the society.

Sl. No.	Name and Address of Individual/Institutional Member	Kind of Membership
1	Librarian DAV College Kanpur U.P.	Annual Institutional
2	Director Keoladeve National Park, Bharatpur, Rajasthan	Life Institutional
3	St. Thomas College, Dehradun	Life Institutional
4	Mr. GIG Mann, Principal, Carman School, Nehru Road, Dehradun.	Life Member
5	Dr. Manju Sharma 8/44, Sector 3, Rajendra Nagar, Shahibabad, Distt. Gaziabad, U.P.	Life Member
6	Mr. Vikram Singh Tomar Forest Range Officer, Hardwar, Rajaji National Park., Hardwar.	Life Member
7	Prashant Singh, 14, Municipal Road, Dalanwala, Dehradun	Life Member
8	Mr. Mithu Dass C/o Golaghat Tobacco House, Dhodar, Ali bylane, Golaghat, Assam	Annual Member
9	Ms Paramjeet Kaur Liberarian, Welham Girls School, Dehradun	Annual Member

10 Dr. Rajender Singh Negi,
856- Indira Nagar, P.O. New Forest, Dehradun

Annual Member

11 Master Angad Singh Randhawa
Gurudev Niwas, Devpura, Haridwar

Student Member

12 Karan Veer Singh Ghumman
Gurudev Niwas, Devpura, Haridwar

Student Member

Tiger Balm for the Soul

Chetan Chauhan reports on some rare good news

Alarmed by the numerous tiger deaths over the past few years, the National Tiger Conservation Authority (NTCA) has drawn up a Rs. 600 Crore plan for protection of tigers and relocation of an estimated 2000 villages from the 29 tiger reserves in the country.

In the first major step, NTCA has asked the state governments to identify the villages that are to be relocated in the first phase. "Relocation will be done only where it is necessary", an NTCA member said. The state governments would be assisted by the Wildlife Institute of India to priorities villages that need relocation in the next five years. The Dehra Dun based Wildlife Institute of India is also conducting a survey of all national parks and sanctuaries for identification of the villages. Relocation can start in a few months, an official at the Union Ministry of environment and forests said.

However, Raman Sukumar, professor at Bangalore's Indian Institute of Science and member of the NTCA, cautions the government on the approach. "We cannot create isolated habitats for tigers and elephants. It would make the job of poachers easy. Involvement of locals in protection is important," he told Sunday HT.

Environmentalists such as Valmik Thapar have been arguing that the government should relocate the people living inside the reserves to check poaching, as in many cases the villagers have been found to be protecting poachers.

The NTCA has firm up a proposal to seek over Rs. 600 Crore in the 11th Five Year Plan. Of this, about Rs. 70 crore for compensating in cases of man-animal conflicts, Rs. 100 Crore for creating buffer zones, and Rs. 200 Crore for relocation of Village from 'crucial' inhabitates in tiger reserves within five years.

Source : Sunday Hindustan Times, New Delhi, March 11, 2007

Sariska to get tigers

Sariska may soon have tigers once again. The Rajasthan and Central Government have agreed upon a roadmap to relocated tigers back into the reserve.

The Union Ministry of environment and forests will provide Rs. 3.5 Crore for relocation of 12 villages from inside the reserve and to construct a bypass to the Alwar-Tanagiri road. Wildlife Institute of India (WII) had blamed the road for tigers going missing from the reserve. WII conducted an ecological analysis of the reserve on the Union ministry's request after reports washed up that there were no tigers left in Sariska. The contents of the WII study are scary: among other things, it says that almost 11 square km. of the forest and green cover in the reserve has been lost in the past few years.

Recently, the Chief Wildlife Warden of Rajasthan informed the Union ministry that the process of relocation of villages had started, and that an alternative site had been acquired. If things go to plan, within a year or two Sariska would have tigers once again, a ministry official said.

Source : Sunday Hindustan Times, New Delhi, March 11, 2007

To Save the tiger, sell it

The largest market for tiger products considers lifting trade ban

The Chinese government's proposal to lift its 14 years old ban on the domestic trade of tiger body parts has triggered an intense debate among Indian conservationists. At the heart of the debate is the concept of a tiger farm.

Over the last decade, tiger farms have cropped up in many parts of China and Thailand. The idea is to breed tigers in captivity – like a poultry farm, where chickens are bred – and slaughter them to sell their bones and skin. This, it is argued by those who support the farms, will reduce the poaching of wild tigers and meet the demand for products.

Barun Mitra, director of the Delhi-based think-tank Liberty Institute, is one person in India who is strongly lobbying for lifting the ban in China. His declared motto : "To save the tiger, sell it." Mitra was part of a team of Indian wildlife experts and economists who visited China's breeding centres this January to give suggestions on the proposal, Mitra contends that if China lifts the ban, tiger products will be easily available and hence their demand will fall. "And poaching will definitely go down."

PK Sen, former head of Project Tiger, fears that lifting the ban in China would have terrible implications for the tiger population in India. "As soon as China lifts the

ban, there will be an added incentive for poachers in India. The products from one slaughtered captive tiger would be about Rs.20 lack. But for a tenth of the price, a consumer could get products from a poached tiger," he says.

"Any policy decision across the world concerning tigers will have a direct effect on India," says Tito Joseph of the Wildlife Protection Society of India. "Over 70 percent of the world's tiger population is in India," he explains. "By lifting the ban on the sale of tiger products, China will encourage poaching in India."

Sameer Sinha, head of Traffic India, an organization that tracks trade in wildlife, says that breeding tigers in captivity isn't a conservation exercise. "The cost of rearing such tigers will push up the price of their products and increase poaching," he says. Mitra, on the other hand, feels the current illegal nature of the trade increases the price at every level. "This won't be the case when the ban is lifted." He counters.

Conservationists such as Joseph, however, maintain there is no way of telling whether the bones, teeth, nails being sold belong to an animal which was poached or raised on a farm.

"Tigers breed in captivity are useless when it comes to maintaining ecological balance. You cannot release them into the wild, because they do not have the ability to survive," says Joseph. "China is only looking at the economic benefits and is not bothered about ecological concerns."

Source : Report by Veenu Sandhu and Mayank Tewari in Sunday Hindustan Times, New Delhi, March 11, 2007

Book Review

Title	-	BIRDS OF PREY OF THE INDIAN SUBCONTINENT
Author	-	Rishad Naoroji with Illustrations by N. John Schmitt.
Publisher	-	Published in 2007 by Om Book International 4379/4B Prakash House, Ansari Road, Darya Ganj, New Delhi-11002, India.
		Printed & bound in China on behalf of Compass Press Ltd.
Price	-	£ 40
Comments	-	This is the first scientifically based book on the diurnal raptors of the Indian subcontinent, Rishad Naoroji, the author of the book has put together his own original and extensive observations on the birds of

prey of the Indian subcontinent along with the existing information on them. The book will prove to be of lasting value and throws light on unknown aspects of Indian raptors pointing also the way for future work. The book comes at a time when due to wanton destruction of habitat and extensive use of most toxic of pesticides, banned in many parts of the world, a massive decline in the number of raptors has taken place. Disappearance of over 95% of some very common species of vultures due to use of a drug 'Dichlofinac' has already caused serious concern among ornithologists and conservationists. The book can certainly stimulate and inspire the future generations to fight a conservation battle to save our natural heritage, including some spectacular birds of prey for the benefit of our coming generations.

I have known the author, during his extensive field work for the book, in and around Corbett Tiger Reserve. His total dedication in raptors despite his background of a respected and affluent Industrial family of the country, should inspire the youth of this country to take up the conservation issues with great zeal, irrespective of their professional or economic background.

Book Review

FROM "A BUNCH OF OLD LETTERS"

(Letter from Edward Thomson to Jawaharlal Nehru)

Scar Top,
Boars Hill, Oxford,
January 2, 1938.

Dear Nehru

I agree that human business comes first. But the other animals matter also and something can be done for them at the same time. If some species gets extinct, then a mischief which can never be repaired has happened and a piece of immemorial India has been thrown into the abyss. And it has always seemed to me the utterest impertinence, the way a handful of rich and ruling people assume that they have the right to destroy the features of one's country, for you and for the generations that follow.

You can do some things to help. First, if any animal or bird is protected because it is nearly extinct, it should be an offence in law to offer it for sale. You have some nearly extinct birds whose flesh is openly sold. Also rhinoceros' horns, which the Calcutta Chinese and others believe are first-rate aphrodisiacs, are sold. It would inflict no real hardship if articles that were sought after for such degraded purposes were driven out of being profitable.

But the most important thing is to create a growing public opinion that kills to 'show-value' of sport so that Indians will show us the way in the west, by refusing to throw up their hands in admiration when told that this or that Raja has butchered 500 tigers (as Rewa has), or countless scores of thousands of sand grouse, or can drive a car at 30 miles an hour while shooting down black-buck. Kill the thing's prestige, as public opinion in south Africa has already largely killed it (and in Canada also). Revive the *ashima* feeling and spread the feeling that your beautiful wild creatures are part of India and part of an inheritance which other people have no right to destroy.

Yours ever,
EDWARD THOMPSON

Cheetal

Young Readers Section

पर्यावरण पथ का राही

श्री माइक पांडे

शेर, चीता, बाघ, हाथी जैसे खूंखार जानवरों से सामना हो, तो बड़े-बड़ों का पसीना छूट जाता है, पर हमारे बीच कुछ ऐसे बिरले लोग भी हैं, जिनकी दुनिया इन्हीं के इर्द-गिर्द बसती है। ऐसी ही शख्सीयत हैं मशहूर पर्यावरणविद् श्री माइक पांडे। केन्या में पैदा हुए श्री माइक पांडे सात साल की उस छोटी उम्र में ही कैमरे से खेलने लगे थे, जब बच्चे अमूमन गुड्डे-गुड्डियों से खेला करते थे। लेकिन उस शौक ने आज उन्हें दुनिया भर में एक नई पहचान दी है। फोटोग्राफी की बारीकियाँ सीखकर आज वह फिल्म डाइरेक्शन के क्षेत्र में भी एक मुकाम हासिल कर चुके हैं। उनकी फिल्में मनोरंजक न होकर, रोमांचकारी, ज्ञानवर्द्धक और संदेशप्रद होती हैं। पर्यावरण से विशेष लगाव रखने वाले माइक की एजुकेशन और ट्रेनिंग ब्रिटेन में हुई, उसके बाद उन्होंने हॉलीवुड के रास्ते पर अपने कदम बढ़ाए। अपने कैरियर के शुरुआती दिनों में उन्होंने रजिया सुल्तान, बेताब, गजब आदि फिल्मों में स्पेशल इफेक्ट और ऐक्शन दृश्यों का फिल्मांकन किया।

वर्ष 1994 में माइक को विंडस्क्रीन पांडा अवॉर्ड से नवाजा गया। इस सम्मान से सम्मानित होने वाले वह पहले एशियाई प्रोड्यूसर/डाइरेक्टर हैं। यह ग्रीन ऑस्कर अवॉर्ड उन्हें फिल्म **The Last Immigration – Wild Elephant Capture in Sarguja** के लिए मिला। तीन बार ग्रीन ऑस्कर पा चुके माइक पांडे को पर्यावरण पर उनके बेहतरीन काम के लिए यूनाइटेड नेशन्स पृथ्वी रत्न से भी पुरस्कृत किया जा चुका है। अंतर्राष्ट्रीय स्तर पर पर्यावरण संरक्षण के लिए सक्रिय लोगों में माइक पांडे को पहली कतार में शामिल किया जाता है। उनके कार्य की महत्ता इस बात से प्रदर्शित होती है कि इंटरनेशनल स्तर पर एन्वायरमेन्ट पॉलिसी के निर्धारण के वक्त उनकी फिल्मों पर भी निगाह डाली जाती है।

आजकल माइक पांडे विशेष रूप से गंगा की डालफिन्स, हाथी, टाइगर, और गिद्धों के संरक्षण पर मानव समुदाय का ध्यान केंद्रित करने में जुटे हैं। वर्ष 2000 में शार्क मछलियों के संरक्षण पर बनाई गई फिल्म **“Shores of Silence – Whale Sharks”** के लिए उन्हें ग्रीन ऑस्कर से सम्मानित किया गया, जबकि 2005 में **“Exploration and Adventure”** के लिए उन्हें राष्ट्रीय अवॉर्ड मिला।

फिल्म निर्माण के बारे में उनका स्पष्ट कहना है, ‘मैं पैसे बनाने के लिए फिल्म नहीं बनाता, बल्कि उनके पीछे मेरा उद्देश्य स्थानीय, राष्ट्रीय और अंतर्राष्ट्रीय स्तर पर जागृति फैलाना है।’ करीब तीन दशकों से डॉक्यूमेंट्री फिल्में बना रहे माइक दर्जनों अवॉर्ड्स जीत चुके हैं।

वन्य जीवों पर फिल्म बनाने में कई तरह की परेशानियाँ आती हैं। सबसे पहले तो फाइनेन्स भी खुद ही करना पड़ता है। साथ ही इसमें समय भी बहुत ज्यादा लगता है। शार्क मछली पर फिल्म बनाने में माइक को तीन साल तक शूटिंग करनी पड़ी थी।

अपने नए प्रोजेक्ट्स के बारे में कहते हैं कि अभी तो दूरदर्शन पर अर्थ मेटर्स सीरिज शुरू हुई है। यह प्रोग्राम प्रत्येक रविवार को प्रातः 11 बजे प्रसारित किया जाता है। इस कार्यक्रम का टेलीकास्ट करीब 52 देशों में हो रहा है।

युवाओं के लिए संदेश

श्री माइक पांडे युवाओं के लिए कहते हैं कि हर व्यक्ति को पर्यावरण संरक्षण अभियान में कोई न कोई सार्थक सहयोग देना चाहिए। कोई भी प्रयास छोटा नहीं होता, अगर हर व्यक्ति अपने को सुधारे, तो एक बड़ा परिवर्तन स्वतः हो जाएगा।

युवाओं में पैसे के प्रति बढ़ती असीमित चाह पर वह कहते हैं कि हम इस अंधी दौड़ का हिस्सा तो बन रहे हैं, पर ध्यान रखिए सोने के पहाड़ से जीवनदायी जल नहीं निकल सकता है।

अपने अनुभवों के बारे में माइक बताते हैं कि जानवर कभी भी स्वभाव से हमलावर नहीं होते। वह कहते हैं कि मेरा अनेक बार जंगल में बाघ, हाथी जैसे जानवरों से सामना हुआ है, पर मैंने यही महसूस किया कि अगर हम उन्हें न छेड़ें, तो वे हम पर हमला नहीं करते हैं।

अपने कैरियर के इस मुकाम पर लोगों को बस यह बताना चाहते हैं कि अब समय आ गया है, जब हम जानवरों के प्रति अनजाने में वैर पालकर उन्हें नुकसान पहुंचाने के बजाय उनसे दोस्ताना रिश्ता बनाएं। वह कहते हैं कि मनुष्य में ही सोचने की शक्ति है, इसका इस्तेमाल करते हुए हमें जानवरों के प्रति विनम्र होना चाहिए, जबकि हम जानवरों के दुश्मन बन बैठे हैं। और यह गलत है।

श्रोत : अमर उजाला, देहरादून संस्करण, 7 मार्च, 2007 के कैरियर भाग से

A RAY FROM THEE

*Varun jagga

A RAY came from thee
 N Give me Blessed to make me free'
 So could I not remain far from Lee.
 I don't know but have in my dream
 Since when I swell to accept him
 No not here for the sake of Read
 But to remain close to my natural beeds
 Hurte me a lot when parental leave
 But this was the way one can feel
 Don't know whether will see then on
 Perhaps the fruits of Nature were my alone;
 Also not known what perfect fitter I have
 Yet chance was for me
 Neither told why I wrote
 But this was only way to perceive
 Nevertheless whether it is a Poem within
 But clear to mine what it means;
 Returning to my destiny I feel
 It is not a ray but a ray of hope I need
 There are pending tasks I have to complete
 But didn't find now what they actually is

Bird Family Album

In Sanskrit birds are known as Dwija or twice born. This refers to the fact that life for a bird begins when the egg is laid. But the chick does not come out of the egg immediately after laying. After they are laid the eggs need to be kept protected and warm for some period before the egg hatches and the chick emerges.

During this period the parent birds incubate the eggs or keep them warm with the heat of their own body. At the end of this period, the chicks emerge from eggs. This is their "second birth," so to say.

The chick breaks out of its eggshell by using a sharp "egg tooth" on the top of its beak. All the chicks may not hatch at the same time. There may even be a day or two between the hatching of the first and last egg.

When they hatch the chicks of many ground nesting birds are already covered with down feathers and can see. Such chicks are called precocial. Quite soon they can run around, and search for their own food. Thus the parents do not have a long period of responsibility for their young ones. Partridges, junglefowl, tragopans, sandgrouse, blackwinged stilts, sarus cranes are some examples of birds with precocial chicks.

In some species the newly hatched birds are completely without feathers, blind and quite helpless. They must depend on their parents to feed and protect them. These are called altricial. Different species of sparrows, mynas, parakeets, woodpeckers and owls have altricial chicks.

In the first few days the parents are extremely busy just feeding the hungry chicks. A new chick is estimated to eat twice its own weight in food every day. In the first week, from morning to night, the parents fly back and forth to feed the chicks.

In most cases parents share this work. In some cases the female alone has to care for the newborns. In a few others, as in case of jacanas and painted spine, the male does most of this work.

Life in the nest is not safe. One or two of the chicks may be weaker than the others. Such chicks may find that their healthy, hungry siblings manage to get more food. The weakling may starve, or fall out of the nest, or be crushed by the others. There is always the danger of chicks being eaten by rats, cats, monitor lizards, snakes and crows, Storms, rains and winds may destroy the nest.

Drongo Family Album

This is us – Mr. and Mrs. Black Drongo. Soon after the first rains, I, Mrs. Drongo begins to lay my eggs. The best time for egg laying for me is between 7 and 9 in the morning. I lay three eggs. Now Mr. Drongo and I take turns to incubate our eggs. We have to be patient and cooperate in doing this for the two weeks or so, before our eggs will hatch.

They take hatching. have to wait hours chick and last, the arrive – first then the last

The look like us, all. They just pink bulging eyes are just about towards brought chicks call hungrily as

Drongo Facts

Nest is a flimsy cup like structure made of fine twigs, fibre and cobwebs.

Lays 3-5 eggs, whitish with brownish red spots.

Incubation period is 14-15 days. Both parents take turns to incubate.

There maybe 24-28 hours between hatching of first and last egg.

Chicks are altricial, pink; they open beaks for food, call softly.

On day 5, feathers start appearing.

On day 8, eyes open.

Days 9-15, full feathers appear and upper parts become glossy black.

Day 14-21, chicks flutter and try to fly. Chicks are still fed by parents.

Day 20, tail develops.

Once they leave the nest they do not return.

their time in
Some times we as long as 24 between first number three. At chicks start to one, then another, one.

newborns don't their parents at have no feathers, skin; and a abdomen. Their closed. They can turn their bills where we have their food. The softly and we feed them.

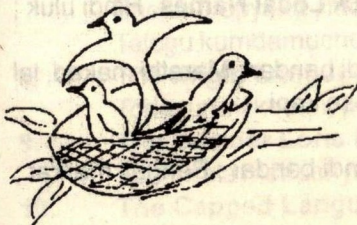
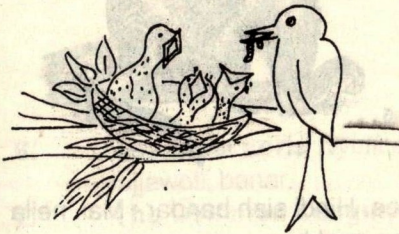
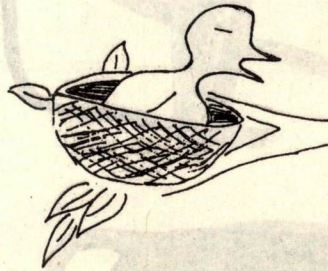
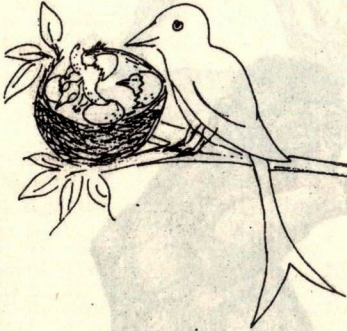
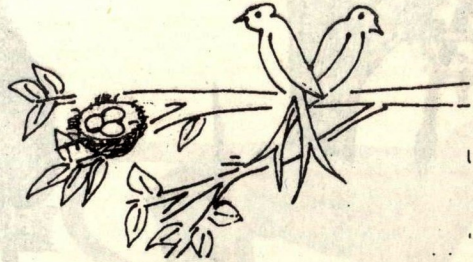
By day three their calls are louder and they turn their heads well to receive their food. Day five – the feathers have begun to appear. Another two days and their upper body has a soft thin feather cover. A day later, they open their eyes, quiver their wings and call more loudly.

By the end of the second week the underparts are fully feathered. The feathers on the upper part are getting longer and glossy black. At last they begin to look a bit like us!

Week three – the bulging abdomen flattens and their bodies begin to takes some shape. The forked tail – our family characteristic has developed. The chicks flutter and try out

their wings. But they are not yet strong enough to fly properly. We still feed them and look after them. They are our chicks after all.

Week four, and our babies have grown. They are ready to leave the nest and go out into the world. We look after them for a couple of days and then they depart. We wish them luck as they fly away to start on their own lives, and families.





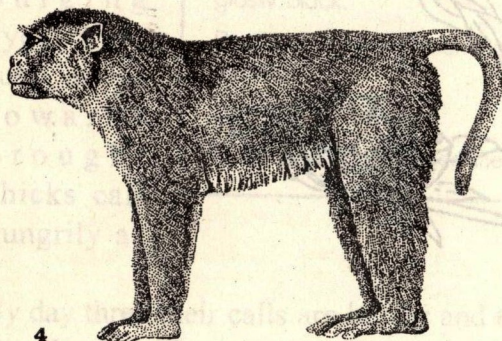
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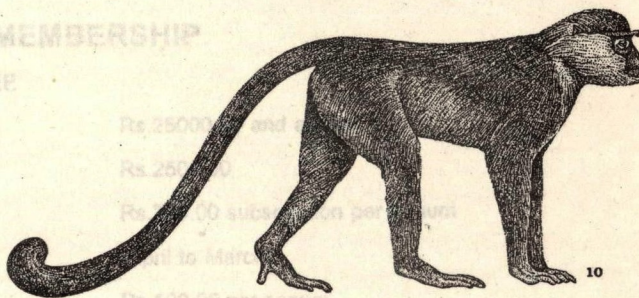


5

1. **The Liontailed Macaque *Macaca silenus* Local Names.** Hindi siah bandar ; Mal. nella manthi, chingala ; Kan. singalika ; Tamil karunkorungoo, arakkan.
2. **The Hoolock, or Whitebrowed Gibbon *Hylobates hoolock* Local Names.** Hindi uluk ; Arakanese tooboung, myouk umaigyau.
3. **The Bonnet Macaque *Macaca radiata* Local Names.** Hindi bandar ; Marathi makad, lai manga ; Malayalam vella manthi ; Tamil korungoo ; Kanarese kapi.
4. **The Assamese Macaque *Macaca assamensis***
5. **The Rhesus Macaque *Macaca mulatta* Local Names.** Hindi bandar ; Bengali markat ; Kashmiri punj, ponj ; Burmese meeauk.



6



6. **The Slow Loris** *Nycticebus coucang* **Local Names.** Hindi sharmindi billi ; Ben. lajjar, lajjawoti, banar.
7. **The Common Langur, or Hanuman Monkey** *Presbytis entellus* **Local Names.** Hindi langur, hanuman ; Himalayas pahari, dendoa ; Kumaon gooni ; Lepcha sahu kaboo ; Bhotia propyaka ; Mar. wana ; Gujarati vandra ; Kan. moosoo, moosoowa ; Coorg kode ; Telegu kumdamuchu ; Tamil korungoo ; Bur. meeauk.
8. **The Nilgiri Langur** *Presbytis johni* **Local Names.** Tamil manthi ; Mal. karing korangu ; Toda turuni kodan, pershk ; Badaga & Kurumba kurri korunga.
9. **The Slender Loris** *Loris tardigradus* **Local Names.** Tel. devanga pilli ; Tamil tevangu ; Kan. mala manushya, kadapapa, adavi manushya ; Coorg chinge kule.
10. **The Capped Langur, or Leaf Monkey** *Presbytis pileatus*

अनोखे वृक्ष

*विवेक जोशी

1. **धुआँ छोड़ने वाले वृक्ष**, जापान में एक ऐसा अनोखा पेड़ पाया जाता है जो सूर्यास्त होने के तुरंत बाद धुआँ छोड़ने लगता है । इस प्रजाति का नाम *Noctus riche* है ।
2. **बिना फूल के फल**, अफ्रीका में पाये जाने वाले **निविलशीया** नामक पेड़ पर बिना फूल के फल लगते हैं ।
3. **तुरन्त बढ़ने वाला पेड़**, अमेरिका के जीशुआद्री नेशनल पार्क में यूका नामक तुरन्त बढ़ने वाला पेड़ पाया जाता है । वहाँ के लोगों ने कभी इसे बढ़ते अथवा धीमी गति से इसकी वृद्धि होते नहीं देखा । उन्होंने जब भी देखा यूका को पेड़ बने पाया ।
4. **दिशा सूचक वृक्ष**, आस्ट्रेलिया में पाये जाने वाले इन पेड़ों की यह विशेषता है कि इनकी पत्तियाँ सदा उत्तर तथा दक्षिण दिशा की ओर रहती हैं तथा इनके तने का एक भाग पूर्व की ओर तथा दूसरा पश्चिम की ओर रहता है ।



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(Established 1958)

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Signature

Signature

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1. The aims and objects of the Society are as follows :-

- (a) To promote interest and impart knowledge regarding the preservation and conservation of all forms of wildlife, particularly among the youth of the country.
- (b) To cooperate with the Govt. of India and State Governments and with others Societies and Institutions having similar aims and objects in working for the interests of wildlife.
- (c) To assist in enforcing and actively supporting the Forests Acts. Wild Birds and animals Protections Acts and Rules etc. of State Governments and the Indian Arms Act and Rules in so far as they pertain to wildlife and to bring to the notice of the authorities any infringement of the same and to assist in the detention and prosecution of offenders in respect of such laws.
- (d) To advise and help the Govt. and wildlife administrators in the formation, maintenance and protection of Sanctuaries and National Parks, preservation of wildlife in general and endangered species of India in particular and in the introduction of exotic species into the country, rehabilitation of endangered species etc. and in the formulation and amendments of rules and acts, so as to conserve and increase wildlife stocks.
- (e) To raise funds for carrying out the above aims and objects and to found and maintain museums reading rooms and libraries of natural history in order to disseminate knowledge regarding wildlife.
- (f) To carry out publicity and propaganda for the preservation of wildlife in India by means of monographs, journals, films, filmstrips and other feasible methods.
- (g) To assist members of the Society in obtaining facilities for viewing and photographing wildlife in India.
- (h) To conduct research into the problem of Wildlife management in India, and in pursuance of this, to initiate, encourage and, where possible assist in the projects of the study of threatened species and related objects and to provide reference and research facilities for such work.
- (i) To carry on such other activities which will serve the above subjects.

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The Wildlife Preservation Society of India

Working President

Shri N.N. Goel Advocate
11-A Nemi Road
Dehradun - 248 001

Executive Vice President

Shri A.S. Negi, IFS (Retd.)
Advisor (Wildlife) Govt. of Uttarakhand
300 Model Colony, Araghar
Dehradun - 248 001

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Shri Ravi Singh
Secretary General & CEO, WWF- India
172, B Lodhi Estate
New Delhi - 3

Shri P.R. Sinha (Ex Officio)
Director, Wild Life Institute of India
Post Box 18, Chandrabani
Dehradun

Dr. B.S. Barfal, IFS
Principal Chief Conservator of Forests, Uttarakhand
85, Rajpur Road, Dehradun - 248 001

Shri S. Chandola, IFS
Add. PCCF & Chief Wildlife Warden, Uttarakhand
Camp Office-Chandrabani, Dehradun

Honorary Secretary

Shri I.S. Negi, IFS (Retd)
12, Sewak Ashram Road,
Dehradun - 248 001

(Ex Officio) Hon. Asst. Secretary

Shri Narendra Singh
21/2-3, Teg Bahadur Road No.4
Dehradun - 248 001

Honorary Treasurer

Dr. S.P. Singh
9A Sewak Ashram Road,
Dehradun - 248 001

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1. Sri. A.S. Negi

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